

MA 16100
EXAM 1 Green
September 19, 2018

NAME _____ YOUR TA'S NAME _____

STUDENT ID # _____ RECITATION TIME _____

Write the following in the TEST/QUIZ NUMBER boxes:

00

 (and blacken in 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 STUDENT IDENTIFICATION NUMBER and blacken in 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 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 in this 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 7:20, you may leave the room after turning in the scantron sheet and the exam booklet. You may not leave the room before 6:50. If you don't finish before 7:20, you MUST REMAIN SEATED until your TA comes and collects your scantron 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, 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: _____

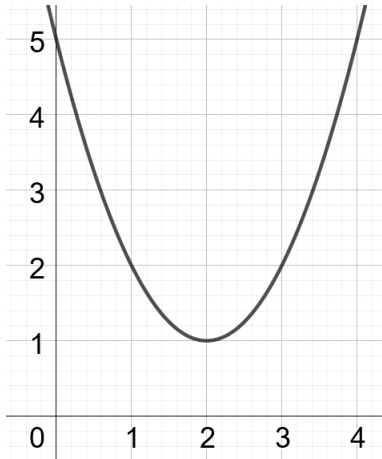
1. Find the domain of the function $f(x) = \sqrt{\ln(x^2 - 4)}$

- A. $(-\infty, -2) \cup (2, \infty)$
- B. $[\sqrt{5}, \infty)$
- C. $(-\infty, -\sqrt{5}] \cup [\sqrt{5}, \infty)$
- D. $(-\infty, -2] \cup [2, \infty)$
- E. $(2, \infty)$

2. Find the inverse of the function $f(x) = \ln(x) - \ln(x + 1)$

- A. $f^{-1}(x) = \frac{e^x}{1 + e^x}$, for $x < 0$
- B. $f^{-1}(x) = \frac{e^x}{e^{x+1}}$, for $x < 0$
- C. $f^{-1}(x) = e^x - e^{x+1}$, for $x < 0$
- D. $f^{-1}(x) = 1 - \frac{1}{e^x}$, for $x < 0$
- E. $f^{-1}(x) = \frac{e^x}{1 - e^x}$, for $x < 0$

3. Consider the functions $f(x) = x^2$, $g(x) = x + 2$, and $h(x) = x - 2$. The following is a graph of which function?



- A. $y = h(f(x + 1))$
B. $y = f(g(x)) + 1$
C. $y = g(f(x + 1))$
D. $y = f(h(x)) + 1$
E. $y = h(f(g(x)))$
4. The displacement of an object (as a function of time) is given by $s(t) = t - \frac{1}{t}$. Find the average velocity of the object for the time interval from $t = 2$ to $t = 4$.

- A. $\frac{5}{4}$
B. $\frac{9}{8}$
C. $\frac{9}{4}$
D. $\frac{9}{2}$
E. $\frac{5}{8}$

5. $\lim_{x \rightarrow 0^-} \left(\frac{|x|}{x} - 1 \right) =$

- A. 0
- B. -2
- C. 1
- D. 2
- E. -1

6. $\lim_{a \rightarrow 0} \left(\frac{\sqrt{a+16} - 4}{a} \right) =$

- A. $\frac{1}{8}$
- B. 4
- C. 8
- D. 16
- E. $\frac{1}{4}$

7. $\lim_{x \rightarrow 0} x^4 \cos\left(\frac{2}{x}\right) =$

- A. 0
- B. 1
- C. ∞
- D. $-\infty$
- E. none of the above

8. If the function

$$f(x) = \begin{cases} x^2 - a, & x \leq 0 \\ x + 5b, & 0 < x < 1 \\ 4x - 2, & x \geq 1 \end{cases}$$

is continuous on $(-\infty, \infty)$, then

- A. $a = -2, b = \frac{2}{5}$
- B. $a = 2, b = \frac{1}{5}$
- C. $a = 1, b = \frac{1}{5}$
- D. $a = 2, b = \frac{2}{5}$
- E. $a = -1, b = \frac{1}{5}$

9. Which of the following functions has $\lim_{x \rightarrow -\infty} f(x) = -1$?

A. $f(x) = \frac{1+x}{x}$

B. $f(x) = -\sin(x)$

C. $f(x) = \frac{1-x}{x}$

D. $f(x) = \sin(x)$

E. $f(x) = \frac{1}{x-1}$

10. Find the total number of horizontal and vertical asymptotes for the function $f(x) = \frac{x-x^2}{9-x^2}$

A. 1 horizontal, 1 vertical

B. 0 horizontal, 1 vertical

C. 1 horizontal, 2 vertical

D. 1 horizontal, 0 vertical

E. 0 horizontal, 2 vertical

11. If $2x + 3y = 6$ is the equation for the tangent line to the function $y = f(x)$ at the point $(a, f(a))$ where $a = 6$ then

- A. $f'(a) = -\frac{2}{3}$, but there is not enough information to determine $f(a)$
- B. $f(a) = 2, f'(a) = 3$
- C. $f(a) = 6, f'(a) = 2$
- D. $f(a) = -2, f'(a) = -\frac{2}{3}$
- E. Neither $f(a)$ nor $f'(a)$ can be determined from the given information.

12. The function $f(x) = |x|$ has which of the following properties?

- (i) Is continuous at all values of x .
 - (ii) Is differentiable at $a = 0$.
 - (iii) Has a vertical tangent line at 0.
 - (iv) Is differentiable at all values a except at $a = 0$.
- A. only (i) and (iv)
 - B. only (iv)
 - C. only (i) and (ii)
 - D. only (iii)
 - E. only (iii) and (iv)