MA 16100
EXAM 1 Version 01
September 21, 2017

NAME ⸻⸻⸻ YOUR TA'S NAME ⸻⸻⸻

STUDENT ID # ⸻⸻⸻ RECITATION TIME ⸻⸻⸻

1. You must use a <u>#2 pencil</u> on the mark–sense sheet (answer sheet).

2. On the scantron, write 01 in the TEST/QUIZ NUMBER boxes and blacken in the appropriate spaces below.

3. On the scantron, fill in your <u>TA's</u> name and the <u>course number</u>.

4. Fill in your <u>NAME</u> and <u>STUDENT IDENTIFICATION NUMBER</u> and blacken in the appropriate spaces. BE SURE TO INCLUDE THE TWO LEADING ZEROS.

5. Fill in your four-digit <u>SECTION NUMBER</u>. If you do not know your section number, please ask your TA.

6. Sign the scantron.

7. Fill in your name and your TA's name on the question sheets above.

8. 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.

9. <u>Turn in both the scantron and the exam booklet when you are finished</u>.

10. You cannot turn in your exam during the first 20 min or the last 10 min of the exam period.

11. NO CALCULATORS, PHONES, BOOKS, OR PAPERS ARE ALLOWED. Use the back of the test pages for scrap paper.

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 be put away and should not be visible at all. 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. The domain of $f(x) = \sqrt{x-1} - \dfrac{1}{\sqrt{2-x}}$ is

A. $[1, 2)$

B. $(1, 2)$

C. $(1, 2]$

D. $[1, \infty)$

E. $[1, 2]$

2. Let $y = e^x$. Shifting the graph 3 units to the left, we get the graph of

A. $y = 3e^x$

B. $y = e^{3x}$

C. $y = e^3 e^x$

D. $y = \frac{1}{3}e^x$

E. $y = e^{x/3}$

3. If $f(x) = 3 + \sqrt{2 + 7x}$, find $f^{-1}(5)$.

A. $\dfrac{1}{7}$

B. $\dfrac{2}{7}$

C. $\dfrac{3}{7}$

D. $\dfrac{4}{7}$

E. $\dfrac{5}{7}$

4. Express the given quantity as a single logarithm

$$\frac{2}{3}\ln(x+8) - \ln \sqrt[3]{x} - \frac{\ln(x^2 - 9)}{3}$$

A. $\ln \sqrt[3]{\dfrac{(x+8)^2(x^2-9)}{x}}$

B. $\ln \sqrt[3]{\dfrac{x(x+8)^2}{(x^2-9)}}$

C. $\ln \sqrt[3]{\dfrac{x^2-9}{x(x+8)^2}}$

D. $\ln \sqrt[3]{\dfrac{2(x+8)}{x(x^2-9)}}$

E. $\ln \sqrt[3]{\dfrac{(x+8)^2}{x(x^2-9)}}$

5.

$$\lim_{x \to 1} \frac{x^2 - 4x + 3}{x^2 - 1} =$$

A. -2

B. -1

C. 0

D. 1

E. 2

6. Solve:

$$\ln(2x + 1) + \ln(x + 3) = \ln(x + 1) + \ln(2x + 4)$$

A. 1

B. 2

C. 3

D. 4

E. 5

7. For the function graphed below, which of the following statements is FALSE?
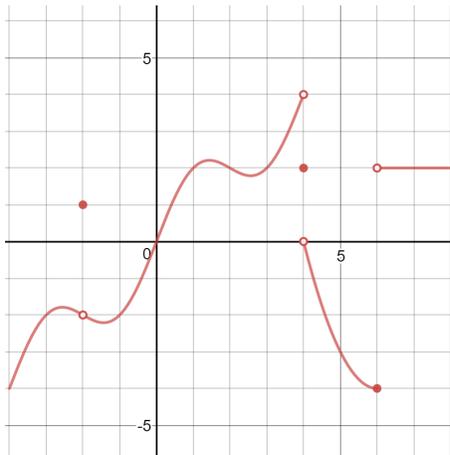
A. $f(x)$ has a jump discontinuity at $x = 4$

B. $f(x)$ is continuous from the left at $x = 6$

C. $f(x)$ has a removable discontinuity at $x = -2$

D. $\lim\limits_{x \to 4} f(x)$ exists

E. $\lim\limits_{x \to -2} f(x)$ exists

8. If

$$f(x) = \begin{cases} \dfrac{x^2 - x}{2x} & \text{if } x \neq 0 \\[2mm] k & \text{if } x = 0 \end{cases}$$

and if f is continuous at $x = 0$, then $k =$

A. -1

B. $-\dfrac{1}{2}$

C. 0

D. $\dfrac{1}{2}$

E. 1

9. Evaluate the limit, if it exists:

$$\lim_{x \to 1} \frac{x - 1}{\sqrt{x^2 + 8} - 3}$$

A. 1

B. 2

C. 3

D. 4

E. The limit does not exist

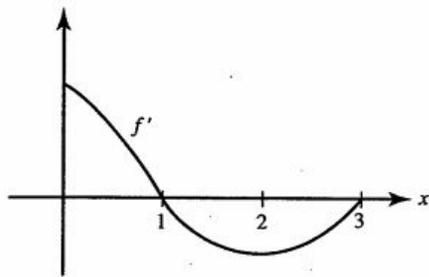**10.** The line $y = -3$ is the LEFT horizontal asymptote (asymptote as $x \to -\infty$) of which of the following functions?

A. $y = -3e^x$

B. $y = \dfrac{1}{x + 3}$

C. $y = \dfrac{-3x}{1 + x^2}$

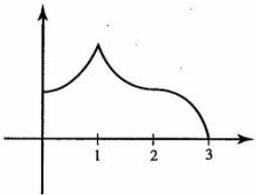D. $y = \dfrac{12x^2 - x}{1 + 4x^2}$

E. $y = \dfrac{e^x - 3}{e^x + 1}$

11. If the tangent line to the graph of $y = f(x)$ at $x = 4$ goes through the points $(5,3)$ and $(7,7)$, what is $f(4)$?
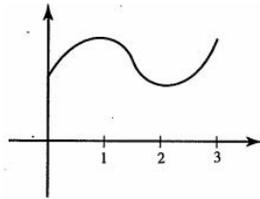
(a) -2

(b) -1

(c) 0

(d) 1

(e) 2

12. The graph of f' (the derivative of f) is shown below. What does the graph of f look like??
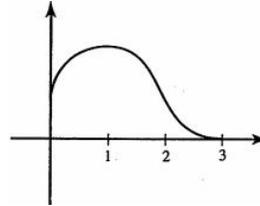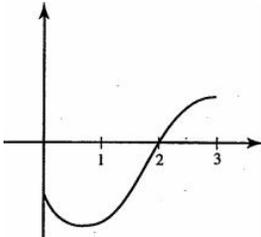

f'

A

B

C

D

E