$\begin{array}{c} \text{MA 16100} \\ \text{MA161 Exam 1} \\ 09/19/2024 \\ \text{TEST/QUIZ NUMBER:} \\ \hline 11 \end{array}$

NAME _____ YOUR TA'S NAME _____

STUDENT ID # _____ RECITATION # _____

You must use a #2 pencil on the scantron answer sheet. Fill in the following on your scantron and blacken the bubbles

- 1. Your name. If there aren't enough spaces for your name, fill in as much as you can.
- 2. Your recitation section number. (If you don't know your recitation section number, ask your TA.)
- 3. Test/Quiz number: **11**
- 4. Student Identification Number: This is your Purdue ID number with two leading zeros
- 5. Blacken in your choice of the correct answer on the scantron answer sheet for questions 1–20.

There are **12** questions, each worth 8 points (you will automatically earn 4 points for taking the exam). Do all your work in this exam booklet. Use the back of the test pages for scrap paper. Turn in both the scantron and the exam booklet when you are finished.

You may not leave the room before 8:20pm. If you finish the exam between 8:20pm and 8:50pm, you may leave the room after turning in the scantron sheet and the exam booklet. If you don't finish before 8:50pm, 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 booklet 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, phone, 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, students must 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 SIGNATURE: _

- 1. How can the graph of $y = 3\sin(2x \pi) + 5$ be obtained from the graph of $y = \sin x$?
 - A. Shift the graph horizontally by π units to the right, then compress the graph horizontally by a factor of 2, stretch it vertically by a factor of 3, and shift it up by 5 units.
 - B. Shift the graph horizontally by $\frac{\pi}{2}$ units to the left, then stretch the graph horizontally by a factor of 2, compress it vertically by a factor of 3, and shift it up by 5 units.
 - C. Shift the graph horizontally by $\frac{\pi}{2}$ units to the left, then stretch the graph horizontally by a factor of 2, stretch it vertically by a factor of 3, and shift it up by 5 units.
 - D. Shift the graph horizontally by $\frac{\pi}{2}$ units to the right, then stretch the graph horizontally by a factor of 2, compress it vertically by a factor of 3, and shift it down by 5 units.
 - E. Shift the graph horizontally by $\frac{\pi}{2}$ units to the right, then compress the graph horizontally by a factor of 2, stretch it vertically by a factor of 3, and shift it up by 5 units.

2. Evaluate the following limit.

$$\lim_{x \to 3} \frac{x^2 - 8x + 15}{x^2 - x - 6}$$

A. -7

B. 1

- C. None of the other answers
- D. 0
- E. $-\frac{5}{2}$

- **3.** An object has position function $s(t) = t^2 + 4t$. Find the average velocity of the object on the interval [1, 3].
 - A. 16
 - B. -16
 - C. -8
 - D. None of the other answers
 - E. 8

4. Where is the function

$$f(x) = \frac{x^2 + 4x + 3}{x^2 - 9}$$

not continuous?

- A. f(x) is continuous everywhere.
- B. x = -3 and x = 3
- C. x = -3 and x = -1
- D. x = 3 Only
- E. x = -3 Only

5. Determine the limit:

 $\lim_{x \to -\infty} (e^x \cos(x) + 3)$

A. 3

- B. The limit does not exist and is neither ∞ nor $-\infty$.
- C. $-\infty$
- D. 0
- E. $+\infty$



6. For the function f(x) shown below, determine which of the following statements is FALSE.

- A. $\lim_{x \to 3} f(x)$ exists
- B. $\lim_{x \to -3^+} f(x) = \infty$
- C. $\lim_{x \to 1^{-}} f(x) \neq \lim_{x \to 1^{+}} f(x)$
- D. f(x) has a vertical asymptote
- E. f(x) has discontinuities at -3, 1, and 3

7. Suppose the domain of f(x) is [-2, 8]. If

$$g(x) = 5f(2x - 6) - 7$$

then what is the domain of the function g(x)?

A. [-13, 17]B. [-10, 10]C. [2, 7]D. [-4, 9]E. [-2, 8]

Vertical Asymptotes

8. Find all the asymptotes of $f(x) = \frac{\sqrt{4x^4 + 1}}{3x^2 + 3x}$. Horizontal Asymptotes

A. y = 0, y = 1B. $y = \frac{2}{3}$ C. $y = \frac{4}{3}$ D. y = 0, y = -1E. $y = \frac{2}{3}$ x = 0, x = 1 x = 0, x = -1 $x = \frac{2}{3}$ x = 0, x = -1

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- **9.** Suppose $M = \log_3 8 \log_3 2$ and $N = 3 \ln(x) + 2$, then
 - A. $M = \log_3 4$ and $N = \ln(e^2 x^3)$
 - B. $M = \log_3 4$ and $N = \ln(3x + 2e)$
 - C. $M = \log_3 6$ and $N = \ln(x^3 + 2)$
 - D. $M = \log_3 4$ and $N = \ln(x^3 + 2)$
 - E. $M = \log_3 6$ and $N = \ln(e^2 x^3)$

10.

$$\sin^{-1}\left(\cos(\frac{3\pi}{4})\right) = ?$$

A.
$$\frac{\pi}{4}$$

B. $\frac{-3\pi}{4}$
C. $\frac{-\pi}{4}$
D. $\frac{5\pi}{4}$
E. $\frac{3\pi}{4}$

11. Evaluate the following limit.

$$\lim_{x \to 0} \frac{\frac{4}{5+x} - \frac{4}{5}}{x}$$

- A. 0 B. $-\frac{2}{15}$
- C. The limit does not exist and is neither ∞ nor $-\infty$.
- D. ∞
- E. $-\frac{4}{25}$

12. Determine the limit:

$$\lim_{x \to 2^{-}} \frac{x - 5}{\sqrt{x^2 - 5x + 6}}$$

A. $+\infty$

- B. $-\infty$
- C. 0
- D. -3
- E. The limit does not exist and is neither ∞ nor $-\infty$.

(This page left intentionally blank for scratch work.)