

MA 16100
EXAM 1 - 09/20/2022
TEST/QUIZ NUMBER: 00

NAME _____ YOUR TA'S NAME _____

STUDENT ID # _____ RECITATION TIME _____

Write the following in the TEST/QUIZ NUMBER boxes and blacken in the appropriate spaces below the boxes on the scantron: 00

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 space for your name, fill in as much as you can.
2. Section number. If you don't know your section number, ask your TA.
3. Test/Quiz number: 00
4. Student Identification Number: **This is your Purdue ID number with two leading zeros**

There are **12** questions, each worth 8 points (you will automatically earn 4 points for filling out your student ID number correctly). 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 scantron 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 SIGNATURE: _____

1. Determine the limit

$$\lim_{x \rightarrow 1^+} \frac{x^2 - 5x + 6}{x - 1}$$

- A. 0
- B. $+\infty$
- C. The limit does not exist and is neither ∞ nor $-\infty$.
- D. $-\infty$
- E. 1

2. Suppose $f(x) = \frac{2x^3 + 16x^2 + 30x}{x^3 + 5x^2}$. Which of the following statements are correct?

- (i) $y = 2$ is a horizontal asymptote.
- (ii) $x = -5$ is a vertical asymptote.
- (iii) $\lim_{x \rightarrow 0^-} f(x) = \infty$.

- A. All three statements are correct.
- B. Only statements (ii) and (iii) are correct.
- C. Only statements (i) and (iii) are correct.
- D. Only statement (i) is correct.
- E. Only statements (i) and (ii) are correct.

3. Find the limit

$$\lim_{x \rightarrow 25} \frac{\sqrt{x} - 5}{x - 25}$$

A. $\frac{1}{5}$

B. 5

C. ∞

D. $\frac{1}{10}$

E. 0

4. Evaluate:

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

A. 2

B. 0

C. -2

D. -1

E. 1

5. Evaluate:

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

- A. $-\frac{2\pi}{3}$
- B. $\frac{2\pi}{3}$
- C. $\frac{\pi}{3}$
- D. $\frac{4\pi}{3}$
- E. $-\frac{\pi}{3}$

6. Let $f(x) = 2e^x - 10x$. Find all the points on the graph of f at which the tangent line is horizontal.

- A. $x = 10$
- B. $x = 2$
- C. $x = \ln(5)$
- D. $x = 5$
- E. $x = \ln(10)$

7. Assume $\log_b(x) = 4$, $\log_b(y) = 6$, $\log_b(z) = 3$. Evaluate $\log_b\left(\frac{\sqrt{xy}}{z}\right)$

- A. 5
- B. 3
- C. 6
- D. 2
- E. 4

8. Determine the limit:

$$\lim_{x \rightarrow \infty} 5 - \ln(x)$$

- A. 0
- B. The limit does not exist and is neither ∞ nor $-\infty$.
- C. 5
- D. $-\infty$
- E. $+\infty$

9. State the domain D and the range R of the function $f(x) = -\sqrt{16 - x^2}$

A. $D = (-\infty, \infty)$ and $R = (-\infty, 0)$

B. $D = [-4, 0]$ and $R = (-\infty, 0]$

C. $D = [-4, 0]$ and $R = [-4, 4]$

D. $D = [-4, 4]$ and $R = [-4, 0]$

E. $D = (-\infty, \infty)$ and $R = [-4, 0]$

10. Let $f(x) = \sqrt{3x + 1}$. Find the equation of the line tangent to the graph of $f(x)$ at the point $(8, f(8))$.

A. $y = \frac{1}{10}x + 5$

B. $y = \frac{3}{10}(x - 8) + 5$

C. $y = 5(x - 8) + \frac{3}{10}$

D. $y = 5x + 8$

E. $y = \frac{1}{5}(x - 8) + 5$

11. Evaluate:

$$\lim_{x \rightarrow 3} \frac{-(x+2)^2 + 25}{x-3}$$

- A. -10
- B. The limit does not exist and is neither ∞ nor $-\infty$.
- C. -3
- D. $-\infty$
- E. 5

12. The function

$$f(x) = \begin{cases} 1, & x < -1 \\ -x, & -1 \leq x \leq 1 \\ \sin(\pi x), & x > 1 \end{cases}$$

is not continuous at:

- A. $f(x)$ is continuous everywhere.
- B. $x = -1$ and $x = 1$
- C. $x = 0$ and $x = 1$
- D. $x = 1$
- E. $x = -1$