

MAC 2311 Calculus I, Spring 2012, Exam I

Date: _____

Name: _____

Directions:

- Provide the answer in the method and the format the question requires.
- You may not work out more than one problem per page (one sheet has two pages).
- Write down the answers legibly. Unrecognizable steps/works will not be considered for grading.
- Simplify to the best possible, draw the necessary graphs.
- Showing the work is necessary and important. No work means no points.

"On my honor, as a Florida Gulf Coast University Student, I have neither given nor received unauthorized assistance on this work."

SIGNATURE: _____

Part I: Answer All - 10 points

Qn 1: If $f(x) = \ln\left(\frac{\pi(\sqrt{x^2+1})}{\pi}\right)$ then $f(0) =$ _____.

Qn 2: If $f(x) = \sin(x + 1)$, $g(x) = e^{x-1}$, and $h(x) = 1 + \ln x$, then $(h \circ g \circ f)(x) =$ _____.

Qn 3: $\lim_{x \rightarrow 0^+} |x| =$ _____.

Qn 4: True or False: The function $f(x) = x^4 + x^2 + 1$ has a zero by the Intermediate Value Theorem. T / F

Qn 5:

Part II: Answer Any 5 and Only 5 (Sixth and Seventh Solutions will not be graded). Each perfect solution carries 8 points.

1. If $f(x) = \sin(x + 1)$, $g(x) = \frac{e^{x-1}}{x-2}$, then find $(g \circ f)(x)$ and its domain.

2. Find $f^{-1}(x)$ if $f(x) = \frac{e^{x+2} + 1}{e^x}$.

3. Is the function $g(x) = \frac{1 - \sqrt{x}}{1 - x}$ continuous on $(-\infty, \infty)$? If not, find the value of x in which g is not continuous. Also determine whether they are right or left continuous on the points of discontinuity.

4. Find the value of $\lim_{x \rightarrow \infty} \frac{2x^{2014} - x}{x^{2014} - 3x^{53} + x^7 - 1}$ (No shortcuts, write down all the necessary steps, no steps means no points). Also find its Horizontal and Vertical Asymptotes, if any.

5. Let $f(x) = \begin{cases} \frac{x^2-1}{x-1}; & x < 1 \\ 3x^3 + x + 3; & 1 \leq x < 2 \\ 11x + 7; & x \geq 2. \end{cases}$.

(a) $\lim_{x \rightarrow 1^-} f(x) = \underline{\hspace{2cm}}$.

(b) $\lim_{x \rightarrow 2} f(x) = \underline{\hspace{2cm}}$.

(c) True or False: The function $f(x)$ is continuous at $x = 2$. T / F

(d) True or False: The function $f(x)$ is left continuous at $x = 1$. T / F

6. Problem 6

7. Problem 7