

Name: _____ PID: _____

TA: _____ Sec. No: _____ Sec. Time: _____

Math 20A.
Midterm Exam 1
October 22, 2009

Turn off and put away your cell phone.

No calculators or any other electronic devices are allowed during this exam.

You may use one page of notes, but no books or other assistance during this exam.

Read each question carefully, and answer each question completely.

Show all of your work; no credit will be given for unsupported answers.

Write your solutions clearly and legibly; no credit will be given for illegible solutions.

If any question is not clear, ask for clarification.

#	Points	Score
1	6	
2	4	
3	6	
4	6	
5	6	
Σ	28	

1. (6 points) For each of the following functions $f(x)$, compute its derivative $f'(x)$:

(a) $f(x) = 2 \cos(x)e^x$.

(b) $f(x) = \frac{x^5 - e^x}{5x + 1}$.

(c) $f(x) = \pi^3(x + 1)$.

2. (4 points) Find the exact value of

$$\lim_{x \rightarrow 0} \frac{\sqrt{2+x} - \sqrt{2}}{x}$$

and justify your answer.

3. (6 points) Let $f(x) = 5 + \sqrt{x - 5}$.

(a) Determine the domain and range of f .

(b) Find a formula for the inverse $f^{-1}(x)$ and state its domain and range.

4. (6 points) The line tangent to the curve $y = 4 - x^2$ at the point $(2, 0)$ also passes through the point $(0, a)$. Find a .

5. (6 points) Let

$$g(x) = \begin{cases} x + 1 & \text{if } |x| < 3, \\ b - x^2 & \text{if } |x| \geq 3. \end{cases}$$

- (a) Find the constant b so that $g(x)$ is continuous at $x = 3$. Be sure to justify your answer using the definition of continuity.

- (b) With the choice of b you made above, is $g(x)$ continuous for all real numbers x ? Why or why not?