MATH 102: Calculus and Analytic Geometry II

Spring 2017-2018, Quiz 1, Duration: 60 min.

Exercise 0. (2 points)
Write your name and section and circle the name of your instructor.

Name: _____

Section: _____

Circle the name of your instructor:

Zadour Kachadourian Nicolas Mascot

Exercise	Points	Scores
0	2	
1	20	
2	12	
3	14	
4	12	
5	40	
Total	100	

INSTRUCTIONS:

(a) Explain your answers in detail and clearly to ensure full credit.

(b) No book. No notes. No calculator.

(c) Reasonable answer attempts will be taken into account and may result in partial credit, even if they fail to lead to the solution.

(d) The back of the pages are meant for rough work and will not be corrected unless you clealy indicate otherwise.

Exercise 1. (20 points) Let $f(x) = e^x + x$.

(a) **(5 points)** Show that f is 1-to-1.

(b) **(5 points)** What are the domain and range of f?

(c) **(5 points)** What are the domain and range of f^{-1}?

(d) **(5 points)** Find $\dfrac{df^{-1}}{dx}$ at the point $x = f(\ln 2)$.

Exercise 2. (12 points) Let $y = \dfrac{2x(2^x)}{\sqrt{1+x^2}}$. Find the value of $\dfrac{dy}{dx}$ at $x = \sqrt{3}$.
Hint: Logarithmic differentiation.

Exercise 3. (14 points)

Solve the initial value problem (a.k.a. Cauchy problem) $\begin{cases} \dfrac{dy}{dx} = e^{-x-y-2}, \\ \\ y(0) = -2. \end{cases}$

Exercise 4. (12 points)

Determinte whether $\lim_{x\to 4} \dfrac{\sin^2(\pi x)}{e^{x-4}+3-x}$ exists, and compute its value if it does.

Exercise 5. (40 points)

Compute the following integrals:

(a) **(10 points)** $\int_0^{\pi/4} \sin^2(2\theta)\cos^3(2\theta)d\theta$,

(b) **(10 points)** $\int_0^{\pi/9} \sqrt{1+\cos(3x)}dx$,

(c) **(10 points)** $\displaystyle\int_3^4 \frac{dy}{\sqrt{-y^2+6y-5}}$,

(d) **(10 points)** $\int (t^2 - 3t + 10)\cos^2(t)dt.$

END