MATH 220  Test 2  Fall 2018

Name ___________________________  NetID __________________

UIN ___________________________

Circle your TA discussion section.

- AD1, TR 11:00-12:50, Adriana Morales
- ADJ, TR 9:00-10:50, Gayana Jayasinghe
- AD2, TR 9:00-10:50, Hannah Burson
- ADK, TR 10:00-10:50, Madina Bolat
- AD3, TR 1:00-2:50, Dana Neidinger
- ADL, TR 11:00-11:50, Chris Loa
- ADA, TR 8:00-8:50, Gayana Jayasinghe
- ADM, TR 12:00-12:50, Heeyeon Kim
- ADB, TR 9:00-9:50, Felix Clemen
- ADN, TR 1:00-1:50, Josh Wen
- ADC, TR 10:00-10:50, Lutian Zhao
- ADO, TR 2:00-2:50, Kesav Krishnan
- ADD, TR 11:00-11:50, Gidon Orelowitz
- ADQ, TR 10:00-10:50, Felix Clemen
- ADE, TR 12:00-12:50, Josh Wen
- ADR, TR 9:00-9:50, Madina Bolat
- ADF, TR 1:00-1:50, Nachiketa Adhikari
- ADS, TR 12:00-12:50, Chris Loa
- ADG, TR 2:00-2:50, Lutian Zhao
- ADT, TR 2:00-2:50, Nachiketa Adhikari
- ADH, TR 3:00-3:50, Stathis Chrontsios
- ADU, TR 3:00-3:50, Kesav Krishnan
- ADI, TR 4:00-4:50, Stathis Chrontsios
- ADZ, TR 9:00-9:50, Gidon Orelowitz

• Sit in your assigned seat (circled below).
• Do not open this test booklet until I say START.
• Turn off all electronic devices and put away all items except a pen/pencil and an eraser.
• Remove hats and sunglasses.
• There is no partial credit on multiple-choice questions. For all other questions, you must show sufficient work to justify your answer.
• While the test is in progress, we will not answer questions concerning the test material.
• Do not leave early unless you are at the end of a row.
• Quit working and close this test booklet when I say STOP.
• Quickly turn in your test to me or a TA and show your Student ID.

FRONT OF ROOM – 114 David Kinley Hall
1. (10 points) Find $w'(x)$ given that $w(x) = 5x^9 e^{12x}$

2. (10 points) Find $g'(x)$ given that $g(x) = \frac{x^8 + 3 \cos(x)}{x^4 + 5 \sin(x)}$
3. (10 points) Find $f'(x)$ given that $f(x) = \cot (\ln (\sec (5x)))$

4. (10 points) Find $\frac{dy}{dx}$ and write your answer in terms of $x$ given the function $y = (8x)^{(9/x)}$
5. (10 points) Find the slope of the line tangent to the curve $x^4y^2 = 75x - 2y$ at the point (2, 3).

6. (10 points) Evaluate the following limit. Simplify your answer.

$$\lim_{x \to 0} \frac{e^{5x} - 5x - 1}{1 - \cos(9x)}$$
7. (10 points) Determine the $x$-coordinate for the absolute minimum value of the following function.

$$f(x) = 2 \ln(64x^2 + 1) - 320 \arctan(8x)$$
8. (10 points) A function \( f(x) \) is differentiable everywhere and has the following second derivative.

\[
f''(x) = \frac{(2x^2 - 288)(x + 3)^{42}(x^2 + 25)}{20e^{16-x}}
\]

Find the intervals of concavity for \( f(x) \) and state each \( x \)-value at which the graph of \( f(x) \) has an inflection point.

9. (10 points) The curve \( y = f(x) \) has the property that the slope of the curve is always equal to its \( y \)-coordinate multiplied by \( 1/4 \). If the curve goes through the point \((\ln(81), 36)\), then find a formula for \( f(x) \). Simplify your answer.
10. (10 points) A spherical balloon is being inflated so that its diameter is increasing at a constant rate of 6 cm/min. How quickly is the volume of the balloon increasing when the diameter is 50 cm?
Students – do not write on this page!

1. (10 points) ______________________

2. (10 points) ______________________

3. (10 points) ______________________

4. (10 points) ______________________

5. (10 points) ______________________

6. (10 points) ______________________

7. (10 points) ______________________

8. (10 points) ______________________

9. (10 points) ______________________

10. (10 points) ______________________

TOTAL (100 points) ________________