MATH 220

Test 2

Spring 2015

Name ____________________________________________ NetID _______________________

• Sit in your assigned seat (circled below).
• Circle your TA discussion section.
• 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.
• You must show sufficient work to justify each 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.

⊃ AD1, TR 9:00-10:50, Andrew McConvey
⊃ AD2, TR 1:00-2:50, Derrek Yager
⊃ ADA, TR 8:00-8:50, Mi Young Jang
⊃ ADB, TR 9:00-9:50, Stephen Berning
⊃ ADC, TR 10:00-10:50, Sarah Yeakel
⊃ ADD, TR 11:00-11:50, Michael Livesay
⊃ ADE, TR 12:00-12:50, George Shakan
⊃ ADF, TR 1:00-1:50, Albert Tamazyan
⊃ ADG, TR 2:00-2:50, Alonza Terry
⊃ ADH, TR 3:00-3:50, Alonza Terry

⊃ ADJ, TR 9:00-9:50, Mi Young Jang
⊃ ADK, TR 10:00-10:50, Stephen Berning
⊃ ADL, TR 11:00-11:50, Adam Wagner
⊃ ADM, TR 12:00-12:50, Adam Wagner
⊃ ADN, TR 1:00-1:50, Mychael Sanchez
⊃ ADO, TR 2:00-2:50, Mychael Sanchez
⊃ ADP, TR 3:00-3:50, Albert Tamazyan
⊃ ADQ, TR 4:00-4:50, George Shakan
⊃ ADR, TR 9:00-9:50, Michael Livesay

FRONT OF ROOM – 100 Materials Science and Engineering Building
1. (8 points) Find $g'(x)$ given that $g(x) = 10 \arcsin x + 4 \csc(x) - 120 \ln(x) + 6x^8$

2. (8 points) Find $\frac{dw}{dt}$ given that $w = t^7 e^{5t}$

3. (8 points) Find $p'(v)$ given that $p(v) = \cos \left( \sqrt{v^9 + 5v} \right)$
4. (8 points) Find $w'(q)$ given that $w(q) = \frac{\cot (5q)}{q^3 + 4}$

5. (8 points) Find $\frac{dy}{dx}$ given that $x^4e^y = 5x^7 + 2y^3 + 42$. It is okay to leave your answer in terms of both $x$ and $y$. 
6. (8 points) As Nancy walks away from a 700 cm lamppost, the tip of her shadow moves 40% faster than she does. What is Nancy’s height?
7. (12 points) Solve the following differential equations given that the graph of each solution goes through the point \((\theta, \alpha) = (0, 24)\). You must use the given variables.

(a) \(\frac{d\alpha}{d\theta} = 16\alpha\)

(b) \(\frac{d\alpha}{d\theta} = 16\theta\)

8. (10 points) Upon which interval is the function \(f(x) = 7x^4 - 4x^3 + 243\) increasing?
9. (10 points) Evaluate the following limit. Simplify your answer.

\[
\lim_{{x \to 0}} \frac{e^{8x} - 8x - 1}{1 - \cos (3x)}
\]

10. (10 points) A function \( f(x) \) is continuous at each real number and it has the following second derivative.

\[
f''(x) = 12 (e^x + 19) (x - 5)^8 (x - 2)^6 (x + 5)^7
\]

(a) State each interval upon which the graph of \( f(x) \) is concave down.

(b) State each interval upon which the graph of \( f(x) \) is concave up.

(c) State each \( x \)-value at which the graph of \( f(x) \) has an inflection point.
11. (10 points) Suppose $y = \frac{8}{x^6}$ for $x > 0$. Determine the $x$-coordinate for the point on this curve which is closest to the origin.
Students – do not write on this page!

1. (8 points) ________________________

2. (8 points) ________________________

3. (8 points) ________________________

4. (8 points) ________________________

5. (8 points) ________________________

6. (8 points) ________________________

7. (12 points) ________________________

8. (10 points) ________________________

9. (10 points) ________________________

10. (10 points) _______________________

11. (10 points) _______________________ 

TOTAL (100 points) ________________