MATH 220 **Test 2** **Spring 2014**

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, Darlayne Addabbo
▷ **AD2**, TR 1:00-2:50, Ben Fulan
▷ **ADA**, TR 8:00-8:50, Chris Bailey
▷ **ADB**, TR 9:00-9:50, Chris Bailey
▷ **ADC**, TR 10:00-10:50, Andrew McConvey
▷ **ADD**, TR 11:00-11:50, Diaa Taha
▷ **ADE**, TR 12:00-12:50, Paul Spiegelhalter
▷ **ADF**, TR 1:00-1:50, Diaa Taha
▷ **ADG**, TR 2:00-2:50, Paulina Koutsaki
▷ **ADH**, TR 3:00-3:50, Paulina Koutsaki
▷ **ADJ**, TR 9:00-9:50, Jed Chou
▷ **ADK**, TR 10:00-10:50, Jed Chou
▷ **ADL**, TR 11:00-11:50, Andrew McConvey
▷ **ADM**, TR 12:00-12:50, Benjamin Wright
▷ **ADN**, TR 1:00-1:50, Benjamin Wright
▷ **ADO**, TR 2:00-2:50, Paul Spiegelhalter
▷ **ADP**, TR 3:00-3:50, Wan-Yu Wu
▷ **ADQ**, TR 4:00-4:50, Wan-Yu Wu

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FRONT OF ROOM – 100 Materials Science and Engineering Building

1. (10 points) Find $f'(x)$ given that $f(x) = \csc\left(7x^{13} + 8x^7 + 42\right)$

2. (10 points) Find $f'(x)$ given that $f(x) = x^6 e^{8x}$

3. (10 points) Find $f'(x)$ given that $f(x) = \ln\left(\arctan\left(x^{12}\right)\right)$

4. (10 points) Find $\dfrac{dy}{dx}$ given that $x^8y^4 = x^5 + y^9$

5. (10 points) Evaluate the following limit. You must fully justify your answer.

$$\lim_{x \to 0} \frac{xe^{8x} - x}{1 - \cos(12x)}$$

6. (5 points each) Circle the correct limit. There is no partial credit for this problem.

(a) $\lim_{x\to\infty} \dfrac{-10\ln x}{5\sqrt{x}}$

(a) $-\infty$ (b) -2 (c) -1 (d) 0 (e) 1 (f) 2 (g) ∞

(b) $\lim_{x\to\infty} \dfrac{e^{0.04x}-26}{13x}$

(a) $-\infty$ (b) -2 (c) -1 (d) 0 (e) 1 (f) 2 (g) ∞

7. (10 points) Find the absolute maximum and minimum values of $f(x) = \dfrac{\ln x}{x^{17}}$ on the interval $[1, e]$.

8. (10 points) The graph of $y = 3x^2 + 300$ lies above the graph of $y = 24x + 2$. What is the minimum vertical distance between these two graphs?

9. (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 ?

10. (10 points) Solve the following differential equations given that the graph of each solution goes through the point $(\alpha, \theta) = (8, 3)$. You must use the given variables.

(a) $\dfrac{d\theta}{d\alpha} = \dfrac{\alpha}{8}$

(b) $\dfrac{d\theta}{d\alpha} = \dfrac{\theta}{8}$

Students – do not write on this page!

1. (10 points) _____
2. (10 points) _____
3. (10 points) _____
4. (10 points) _____
5. (10 points) _____
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10. (10 points) _____

TOTAL (100 points) _____