MATH 220 **Test 2** **Fall 2012**

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 11:00-12:50, Hannah Kolb Spinoza
▷ **AD2**, TR 9:00-10:50, Ki Yeun Kim
▷ **AD3**, TR 1:00-2:50, Michael Santana
▷ **ADA**, TR 8:00-8:50, Ziying Pan
▷ **ADB**, TR 9:00-9:50, Ziying Pan
▷ **ADC**, TR 10:00-10:50, Lisa Hickok
▷ **ADD**, TR 11:00-11:50, Lisa Hickok
▷ **ADE**, TR 12:00-12:50, Andrew McConvey
▷ **ADF**, TR 1:00-1:50, Jian Liang
▷ **ADG**, TR 2:00-2:50, Derrek Yager
▷ **ADH**, TR 3:00-3:50, Lechao Xiao
▷ **ADI**, TR 4:00-4:50, Lechao Xiao
▷ **ADJ**, TR 9:00-9:50, Meghan Galiardi
▷ **ADK**, TR 10:00-10:50, Meghan Galiardi
▷ **ADL**, TR 11:00-11:50, Andrew McConvey
▷ **ADM**, TR 12:00-12:50, Benjamin Fulan
▷ **ADN**, TR 1:00-1:50, Benjamin Fulan
▷ **ADO**, TR 2:00-2:50, Jian Liang
▷ **ADP**, TR 3:00-3:50, Hongfei Tian
▷ **ADQ**, TR 4:00-4:50, Hongfei Tian
▷ **ADR**, TR 9:00-9:50, Noah Chartoff
▷ **ADS**, TR 12:00-12:50, Derrek Yager
▷ **ADT**, TR 2:00-2:50, Anna Weigandt
▷ **ADU**, TR 3:00-3:50, Anna Weigandt

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FRONT OF ROOM – 314 Altgeld Hall

1. (8 points) Find $f'(x)$ given that $f(x) = 6x^5 + \dfrac{1}{\sqrt[3]{x}} + \csc x - \ln x$

2. (8 points) Find $\dfrac{dv}{dt}$ given that $v = 10t^3 \tan^{-1}(8t)$

3. (8 points) Find $w'(q)$ given that $w(q) = \dfrac{\sin(q^2)}{q^5 + 6q}$

4. (8 points) Find $g'(t)$ given that $g(t) = e^{\cos^2(5t)}$

5. (8 points) Find $\dfrac{dy}{dx}$ given that $x^5y^3 = 4x + 9y$

6. (12 points) At each time t a population P is growing at a rate which is one half of its population size at that time. If the population is 200 at time $t = 0$, then when is the population equal to 1000?

7. (12 points) Oil spilled from a ruptured tanker spreads in a circle whose area increases at a constant rate of 6 mi^2/h. How fast is the radius of the spill increasing when the area is 9 mi^2 ?

8. (12 points) For the curve $y = 9e^{2x} - 8e^{-3x}$, give the x-value at which the tangent line has the smallest slope.

9. (12 points) Suppose that a function $f(x)$ has first derivative given by $f'(x) = e^{2x}\left(2x^2 - 10x + 11\right)$. Determine the largest open interval upon which the graph of $f(x)$ is concave down.

10. (12 points) Evaluate the following limits.

(a) $\lim_{x \to 1^+} \dfrac{\cos(3x)}{\ln x}$

(b) $\lim_{x \to \infty} \dfrac{x^2}{\ln x}$

(c) $\lim_{x \to 0^+} \left(\dfrac{3}{x} - \dfrac{6}{e^{2x} - 1} \right)$

Students – do not write on this page!

1. (8 points) _____
2. (8 points) _____
3. (8 points) _____
4. (8 points) _____
5. (8 points) _____
6. (12 points) _____
7. (12 points) _____
8. (12 points) _____
9. (12 points) _____
10. (12 points) _____

TOTAL (100 points) _____