MATH 220 **Test 2** **Fall 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 11:00-12:50, Melinda Lanius
▷ **AD2**, TR 9:00-10:50, Ben Fulan
▷ **AD3**, TR 1:00-2:50, Mychael Sanchez
▷ **ADA**, TR 8:00-8:50, Derek Jung
▷ **ADB**, TR 9:00-9:50, Derek Jung
▷ **ADC**, TR 10:00-10:50, Andrew McConvey
▷ **ADD**, TR 11:00-11:50, Andrew McConvey
▷ **ADE**, TR 12:00-12:50, David Poole
▷ **ADF**, TR 1:00-1:50, Alonza Terry
▷ **ADG**, TR 2:00-2:50, Alonza Terry
▷ **ADH**, TR 3:00-3:50, Argen West
▷ **ADI**, TR 4:00-4:50, Argen West
▷ **ADJ**, TR 9:00-9:50, Vanessa Rivera-Quiñones
▷ **ADK**, TR 10:00-10:50, Vanessa Rivera-Quiñones
▷ **ADL**, TR 11:00-11:50, David Poole
▷ **ADM**, TR 12:00-12:50, Iftikhar Ahmed
▷ **ADN**, TR 1:00-1:50, Kaiwen Liu
▷ **ADO**, TR 2:00-2:50, Hannah Burson
▷ **ADP**, TR 3:00-3:50, Hannah Burson
▷ **ADR**, TR 9:00-9:50, Stephen Berning
▷ **ADS**, TR 12:00-12:50, Sarah Mousley
▷ **ADT**, TR 2:00-2:50, Kaiwen Liu
▷ **ADU**, TR 3:00-3:50, Iftikhar Ahmed

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1	2	3	4	5	6	D	D	1	2	3	4	5	6	7	8	9	10	11	12	13	D	D	1	2	3	4	5	6	
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FRONT OF ROOM – 100 Materials Science and Engineering Building

1. (8 points) Find $f'(x)$ given that $f(x) = x^{18} + 17x^7 - 42x + 123$

2. (8 points) Find $\dfrac{dv}{dt}$ given that $v = e^{13t}\tan(25t)$

3. (8 points) Find $h'(r)$ given that $h(r) = \left(\dfrac{r^8 + 22}{r^{17} + 62}\right)^{14}$

4. (8 points) Find $w'(v)$ given that $w(v) = \cos\left(v^{12}e^{v}\right)$

5. (8 points) Find $\dfrac{dy}{dx}$ given that $y = \left(x^5 + 8\right)^{6x^2}$

6. (10 points) Find the slope of the line tangent to the curve $y = x^8 \ln(x)$ at $x = e^5$. Simplify your answer.

7. (10 points) The graph of a function $y = f(x)$ has the property that the slope of the tangent line at each point on the graph is equal to one third of its y-coordinate. If the graph goes through the point $(\ln(64), 128)$, then find a formula for $f(x)$. Simplify your answer.

8. (10 points) Determine the absolute minimum y-value on the graph of $y = 2e^{4x} - 648x + 38$. Simplify your answer.

9. (10 points) A polynomial $f(x)$ has the following second derivative.

$$f''(x) = (x-4)^2 (x+7)^6 \left(x^2 - 196\right) \left(x^2 + 25\right)$$

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

10. (10 points) The top of a ladder slides down a vertical wall at a rate of 8 m/s. At the moment when the bottom of the ladder is 4 m from the wall, it slides away from the wall at a rate of 15 m/s. How long is the ladder?

Alternate version for problem 10:

A plane flies horizontally at an altitude of 12 km and passes directly over a tracking telescope on the ground. When the angle of elevation is $\pi/4$ rad, this angle is decreasing at a rate of 0.625 rad/min. How fast is the plane traveling at that time?

11. (5 points each) Evaluate the following limits. Simplify your answers.

(a) $\lim_{x \to 0} \dfrac{e^{6x} - 6x - \cos x}{x^2}$

(b) $\lim_{x \to \infty} \dfrac{10 \arctan(2x) - 5\pi}{10 \arctan(12x) - 5\pi}$

Students – do not write on this page!

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

11a. (5 points) _____

11b. (5 points) _____

TOTAL (100 points) _____