MATH 220 **Test 2** **Spring 2017**

Name _____ **NetID** _____

UIN _____

Circle your TA discussion section.

- ▷ **AD1**, TR 9:00-10:50, Andrew McConvey
- ▷ **AD2**, TR 1:00-2:50, Sarah Loeb
- ▷ **ADA**, TR 8:00-8:50, Christopher Linden
- ▷ **ADB**, TR 9:00-9:50, Dakota Ihli
- ▷ **ADC**, TR 10:00-10:50, Cassie Christenson
- ▷ **ADD**, TR 11:00-11:50, Daulet Dyussekenov
- ▷ **ADE**, TR 12:00-12:50, Daulet Dyussekenov
- ▷ **ADF**, TR 1:00-1:50, Cassie Christenson
- ▷ **ADG**, TR 2:00-2:50, Xinghua Gao
- ▷ **ADH**, TR 3:00-3:50, Xinghua Gao
- ▷ **ADJ**, TR 9:00-9:50, Lan Wang
- ▷ **ADK**, TR 10:00-10:50, Lan Wang
- ▷ **ADO**, TR 2:00-2:50, Christopher Linden
- ▷ **ADQ**, TR 4:00-4:50, Dakota Ihli

- 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.

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FRONT OF ROOM – 100 Materials Science and Engineering Building

1. (10 points) Find $g'(t)$ given that $g(t) = \dfrac{\arctan\left(t^9\right)}{t^{21}}$

2. (10 points) Find $w'(x)$ given that $w(x) = e^{7\sin^6(5x)}$

3. (10 points) Find $\dfrac{dy}{dx}$ given that $x^5y^8 = 14x^3 + 5y$

4. (10 points) Find the equation of the line tangent to the following curve at its y-intercept.

$y = 5\sin(x) + 25e^x + 12x + 10$

5. (10 points) A bullet is shot upward from the surface of a planet so that its height in meters until coming to rest is given by the equation $s(t) = 195t - 6.5t^2$ where t is measured in seconds. Answer the following questions and be sure to use proper units in each answer.

   (a) What is the acceleration due to gravity on this planet?

   (b) What is the bullet's initial velocity?

   (c) At what time does the bullet reach its maximum height?

6. (10 points) Evaluate the limit. You must fully justify your answer.

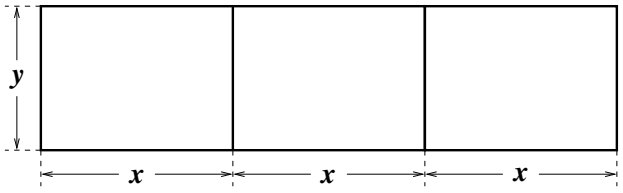
$$\lim_{x \to 0} \frac{e^{13x} - 13x - 1}{e^{7x} - 7x - 1}$$

7. (10 points) Find the absolute minimum y-value of the given function.

$$y = \frac{2x}{\sqrt{x - 81}}$$

8. (10 points) Let $f(x) = \ln\left(x^2 - 225\right)$. Determine each interval where f is increasing and each interval where f is decreasing.

9. (10 points) A farmer wishes to fence off three identical adjoining rectangular pens as in the diagram shown, but she only has 600 feet of fencing available. Determine the values for x and y which will maximize the total area enclosed by these three pens.



10. (10 points) A spherical balloon is inflated at a constant rate of 120π cubic feet per minute. At one particular time, the balloon's radius is increasing at 5 feet per minute. What is the balloon's radius at that particular time?

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) _____