

MATH 220

Test 1

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

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FRONT OF ROOM – 100 Materials Science and Engineering Building
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1. (4 points each) Circle **true** if the given statement is always true. Otherwise circle **false**.

(a) A function which is continuous at a point a must also be differentiable at a .

true or **false** ?

(b) If $f(x) = \sin(x^3)$ and $g(x)$ is an odd function, then the composite function $(g \circ f)(x)$ is an odd function.

true or **false** ?

(c) If the finite limit $\lim_{t \rightarrow 2} \frac{h(t) - h(2)}{t - 2}$ exists then the function h is continuous at 2.

true or **false** ?

(d) The function $y = \frac{9x - 63}{x^2 + 6x - 91}$ has a vertical asymptote at $x = 7$.

true or **false** ?

(e) If the point $(\frac{1}{4}, -4)$ is on the graph of a one-to-one function $f(x)$ then the point $(4, -\frac{1}{4})$ must be on the graph of $f^{-1}(x)$.

true or **false** ?

2. (10 points) Let $f(x) = 17x^2 - 42x$.

Use the definition of a derivative as a limit to prove that $f'(x) = 34x - 42$.

Show each step in your calculation and be sure to use proper terminology in each step of your proof.

3. (10 points) Use interval notation to state the domain of the given function.

$$g(x) = \ln(196 - x^2) + \arccos\left(\frac{x - 10}{6}\right)$$

4. (10 points) An exponential function has a y -intercept of 12 and passes through the point $(-3, 84)$. Determine a formula for this function.

5. (10 points) Determine a formula for $g^{-1}(x)$ given that $g(x) = \frac{12e^x}{5 + 4e^x}$

6. (5 points) Solve the following equation for x and simplify your answer.

$$\ln x = 3 \ln 4 - 2 \ln 12$$

7. (5 points) Given that $\cot \theta = 3$, evaluate the following quantity and simplify your answer.

$$\tan^2 \theta + \csc^2 \theta + \cos^2 \theta + \sin^2 \theta$$

8. (5 points) Evaluate the following quantity and simplify your answer.

$$\cos(2 \arcsin(0.375))$$

9. (5 points each) Evaluate the following limits without the use of derivatives. Show sufficient justification for each answer. An answer of 'does not exist' is not sufficient. For infinite limits you must state if it is ∞ or $-\infty$.

(a) $\lim_{x \rightarrow 5} \frac{1}{\sqrt{x^2 + 144} - x}$

(b) $\lim_{x \rightarrow 2} \frac{x^2 + 10x - 24}{x^8 - 2x^7}$

$$(c) \lim_{x \rightarrow \infty} \frac{(6x + 5)^2}{7 - 4x^2}$$

$$(d) \lim_{x \rightarrow 13^-} \frac{\ln(169 + x^2)}{\ln(169 - x^2)}$$

$$(e) \lim_{x \rightarrow 7^+} \frac{\ln(50 + x^2)}{\ln(50 - x^2)}$$

Students – do not write on this page!

1. (20 points) _____

2. (10 points) _____

3. (10 points) _____

4. (10 points) _____

5. (10 points) _____

6. (5 points) _____

7. (5 points) _____

8. (5 points) _____

9a. (5 points) _____

9b. (5 points) _____

9c. (5 points) _____

9d. (5 points) _____

9e. (5 points) _____

TOTAL (100 points) _____