

MATH 220**Test 1****Fall 2015**

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, Derek Jung	▷ ADJ , TR 9:00-9:50, Elizabeth Field
▷ AD2 , TR 9:00-10:50, Claire Merriman	▷ ADK , TR 10:00-10:50, Elizabeth Field
▷ AD3 , TR 1:00-2:50, Itziar Ochoa de Alaiza Gracia	▷ ADL , TR 11:00-11:50, Emily Heath
▷ ADA , TR 8:00-8:50, Dara Zirlin	▷ ADM , TR 12:00-12:50, Alyssa Loving
▷ ADB , TR 9:00-9:50, Dara Zirlin	▷ ADN , TR 1:00-1:50, Aaron Schneberger
▷ ADC , TR 10:00-10:50, Xujun Liu	▷ ADO , TR 2:00-2:50, Tigran Hakobyan
▷ ADD , TR 11:00-11:50, Christopher Linden	▷ ADP , TR 3:00-3:50, Tigran Hakobyan
▷ ADE , TR 12:00-12:50, Christopher Linden	▷ ADR , TR 9:00-9:50, Xujun Liu
▷ ADF , TR 1:00-1:50, Alyssa Loving	▷ ADS , TR 12:00-12:50, Emily Heath
▷ ADG , TR 2:00-2:50, Xianchang Meng	▷ ADT , TR 2:00-2:50, Argen West
▷ ADH , TR 3:00-3:50, Xianchang Meng	▷ ADU , TR 3:00-3:50, Argen West
▷ ADI , TR 4:00-4:50, Aaron Schneberger	

				Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	R1	R2	R3			
				P1	P2	P3	P4	P5	P6	P7	P8	P9		P1	P2	P3	P4	P5
N1	N2	N3	N4	N5	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10				
M1	M2	M3	M4	M5	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10				
L1	L2	L3	L4	L5	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10				
K1	K2	K3	K4	K5	K1	K2	K3	K4	K5	K6	K7	K8	K9	K10				
J1	J2	J3	J4	J5	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10				
H1	H2	H3	H4	H5	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10				
G1	G2	G3	G4	G5	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10				
F1	F2	F3	F4	F5	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10				
E1	E2	E3	E4	E5	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10				
D1	D2	D3	D4	D5	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10				
C1	C2	C3	C4	C5	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10				
B1	B2	B3	B4	B5	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10				
A1	◊	◊	◊	◊											◊	◊	◊	◊

1. (25 points) Circle **true** if the given statement is always true. Otherwise circle **false**.

- (a) The function $y = \frac{2x^2 - 242}{x + 11}$ has a vertical asymptote at $x = -11$.

true or false ?

- (b) If $\alpha(t)$ and $\beta(t)$ are both odd functions, then $\gamma(t) = \alpha(t)\beta(t)$ is an even function.

true or false ?

- (c) A function which is continuous at a number a must also be differentiable at a .

true or false ?

- (d) If the finite limit $\lim_{s \rightarrow 10} \frac{w(s) - w(10)}{s - 10}$ exists, then the function w is continuous at 10.

true or false ?

- (e) If a function $g(r)$ is not defined at $r = b$, then $\lim_{r \rightarrow b} g(r)$ does not exist.

true or false ?

2. (10 points) Let $g(x) = 42x - 13x^2$.

Use the definition of a derivative as a limit to prove that $g'(x) = 42 - 26x$.

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

3. (10 points) The graphs of $f(x) = \ln(6) + 5\ln(-x)$ and $g(x) = \ln(-150x^3)$ intersect. Determine the x -value for each point of intersection. Simplify your answer.

4. (10 points) What is the domain of the function $\frac{\ln(18-x)}{\sqrt{20-x} - \sqrt{x-6}}$?

5. (5 points each) Evaluate the following quantities and simplify your answers.

$$(a) \csc(\arctan(12))$$

$$(b) \ln\left(\frac{56}{e^{18}}\right) + \ln\left(\frac{e^6}{8}\right) + 12$$

$$(c) 9\cos\left(\frac{2\pi}{17}\right) + 18\sin^2\left(\frac{\pi}{17}\right)$$

6. (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 $-\infty$.

$$(a) \lim_{x \rightarrow 8/7} \frac{49x^2 - 64}{7x - 8}$$

$$(b) \lim_{x \rightarrow \infty} \frac{6x^{12}(5x + 3)^2}{2 + 15x^{14}}$$

$$(c) \lim_{x \rightarrow 0} \frac{\sqrt{x^2 + 169} - 13}{5x^2}$$

$$(d) \lim_{x \rightarrow -\infty} \frac{8 + 4/x}{7e^x}$$

$$(e) \lim_{x \rightarrow 5^+} (14 \ln(x^2 - 25) + 8e^{x-5})$$

$$(f) \lim_{x \rightarrow \infty} \frac{\sin x}{x}$$

Students – do not write on this page!

1. (25 points) _____

2. (10 points) _____

3. (10 points) _____

4. (10 points) _____

5a. (5 points) _____

5b. (5 points) _____

5c. (5 points) _____

6a. (5 points) _____

6b. (5 points) _____

6c. (5 points) _____

6d. (5 points) _____

6e. (5 points) _____

6f. (5 points) _____

TOTAL (100 points) _____