MATH 220 **Test 1** **Fall 2013**

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, Sarah Loeb / Hannah Spinoza
▷ **AD2**, TR 9:00-10:50, M.Tip Phaovibul
▷ **AD3**, TR 1:00-2:50, Cara Monical
▷ **ADA**, TR 8:00-8:50, Nima Rasekh
▷ **ADB**, TR 9:00-9:50, Hong Liu
▷ **ADC**, TR 10:00-10:50, Hong Liu
▷ **ADD**, TR 11:00-11:50, Stephen Berning
▷ **ADE**, TR 12:00-12:50, Stephen Berning
▷ **ADF**, TR 1:00-1:50, Christopher Bailey
▷ **ADG**, TR 2:00-2:50, Christopher Bailey
▷ **ADH**, TR 3:00-3:50, Neriman Tokcan
▷ **ADI**, TR 4:00-4:50, Neriman Tokcan
▷ **ADJ**, TR 9:00-9:50, Nima Rasekh
▷ **ADK**, TR 10:00-10:50, Michael Obiero Oyengo
▷ **ADL**, TR 11:00-11:50, Andrew McConvey
▷ **ADM**, TR 12:00-12:50, Benjamin Wright
▷ **ADN**, TR 1:00-1:50, Benjamin Wright
▷ **ADO**, TR 2:00-2:50, Vanessa Rivera-Quiñones
▷ **ADP**, TR 3:00-3:50, Vanessa Rivera-Quiñones
▷ **ADR**, TR 9:00-9:50, Michael Santana
▷ **ADS**, TR 12:00-12:50, Andrew McConvey
▷ **ADT**, TR 2:00-2:50, Alessandro Gondolo
▷ **ADU**, TR 3:00-3:50, Alessandro Gondolo

263	264	265	266	267	268	269	270	•	271	272	273							278	279	•	280	281	282	283	284	285	286	287
240	241	242	243	244	245	246	•	247	248	249	250	251	252	253	254	255	•	256	257	258	259	260	261	262				
217	218	219	220	221	222	223	•	224	225	226	227	228	229	230	231	232	•	233	234	235	236	237	238	239				
194	195	196	197	198	199	200	•	201	202	203	204	205	206	207	208	209	•	210	211	212	213	214	215	216				
171	172	173	174	175	176	177	•	178	179	180	181	182	183	184	185	186	•	187	188	189	190	191	192	193				
148	149	150	151	152	153	154	•	155	156	157	158	159	160	161	162	163	•	164	165	166	167	168	169	170				
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116	117	118	119	120	121	122	•	123	124	125	126	127	132	145	130	131	•	16	133	134	135	136	137	138				
93	94	95	96	97	98	99	•	100	101	102	103	128	105	106	107	108	•	109	110	111	112	113	114	115				
70	71	72	73	74	75	76	•	77	78	79	80	81	82	83	84	85	•	86	87	88	89	90	91	92				
47	48	49	50	51	52	53	•	54	55	104	57	58	59	60	61	62	•	63	64	65	66	67	68	69				
24	25	26	27	28	29	30	•	31	32	33	34	35	36	37	38	39	•	40	41	42	43	44	45	46				
1	2	3	4	5	6	7	•										•	17	18	19	20	21	22	23				

FRONT OF ROOM – 314 Altgeld Hall

1. (5 points each) Some values for functions $a(x)$, $b(x)$, $c(x)$, $d(x)$, $e(x)$ and $f(x)$ are given in the table.

x	$a(x)$	$b(x)$	$c(x)$	$d(x)$	$e(x)$	$f(x)$
-2	3	1	32	4	-5	1
0	0	2	8	1	-3	2
2	-3	8	2	4	0	3
4	-6	64	$1/2$	1	3	5
6	-9	1024	$1/8$	4	5	8

i. Given that one of the functions is exponential, which one is it? Circle the correct choice.

(a) $a(x)$ (b) $b(x)$ (c) $c(x)$ (d) $d(x)$ (e) $e(x)$ (f) $f(x)$

ii. Given that one of the functions is linear, which one is it? Circle the correct choice.

(a) $a(x)$ (b) $b(x)$ (c) $c(x)$ (d) $d(x)$ (e) $e(x)$ (f) $f(x)$

iii. Given that one of the functions is even, which one is it? Circle the correct choice.

(a) $a(x)$ (b) $b(x)$ (c) $c(x)$ (d) $d(x)$ (e) $e(x)$ (f) $f(x)$

iv. Given that one of the functions is odd, which one is it? Circle the correct choice.

(a) $a(x)$ (b) $b(x)$ (c) $c(x)$ (d) $d(x)$ (e) $e(x)$ (f) $f(x)$

v. Given that one of the functions is equal to $f^{-1}(x)$, which one is it? Circle the correct choice.

(a) $a(x)$ (b) $b(x)$ (c) $c(x)$ (d) $d(x)$ (e) $e(x)$ (f) $f(x)$

2. (10 points) Let $g(x) = 8x - 6x^2$.

   Use the definition of a derivative as a limit to prove that $g'(x) = 8 - 12x$.

   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 $f(x) = 4e^{6x}$ and $g(x) = 20e^{-7x}$ intersect. Determine the x-value for the point of intersection. Simplify your answer.

4. (10 points) What is the domain of the function $\dfrac{\ln(16 - x)}{\sqrt{20 - x} - \sqrt{x - 8}}$?

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

(a) $\cot\left(\arcsin(5/8)\right)$

(b) $\ln\left(\dfrac{35}{e^{14}}\right) + \ln\left(\dfrac{e^2}{5}\right) + 12$

(c) $4\cos\left(\dfrac{2\pi}{13}\right) + 8\sin^2\left(\dfrac{\pi}{13}\right)$

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) $\lim_{x\to\infty} \dfrac{(2x+3)^2}{17+5x^2}$

(b) $\lim_{x\to 0} \dfrac{\sqrt{x^2+64}-8}{x^2}$

(c) $\lim_{x\to 4/5} \dfrac{25x^2-16}{5x-4}$

(d) $\lim_{x \to -\infty} \dfrac{3 + 5/x}{9e^x}$

(e) $\lim_{x \to 5^+} \left(4 \ln \left(x^2 - 25\right) + 8e^{x-5}\right)$

(f) $\lim_{x \to 1} \dfrac{\sin x}{x}$

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) _____