AL1 (MWF 10:00-10:50) AL3 (MWF 1:00-1:50) AL2 (MWF 3:00-3:50)

MATH 220 **Test 1** **Fall 2019**

Name _____ **NetID** _____

UIN _____

Circle your TA discussion section.

- ▷ **AD1**, TR 11:00-12:50, Mina Nahvi
- ▷ **AD2**, TR 9:00-10:50, Adriana Morales
- ▷ **AD3**, TR 1:00-2:50, Vincent Villalobos
- ▷ **AD@**, TR 9:00-9:50, Phuong "Sophie" Le
- ▷ **ADA**, TR 8:00-8:50, Scott Harman
- ▷ **ADB**, TR 9:00-9:50, Lutian Zhao
- ▷ **ADC**, TR 10:00-10:50, Lutian Zhao
- ▷ **ADD**, TR 11:00-11:50, Dara Zirlin
- ▷ **ADE**, TR 12:00-12:50, David Altizio
- ▷ **ADF**, TR 1:00-1:50, Saaber Pourmotabbed
- ▷ **ADG**, TR 2:00-2:50, John "Connor" Grady
- ▷ **ADH**, TR 3:00-3:50, Sarah Simpson
- ▷ **ADI**, TR 4:00-4:50, Ryan McConnell
- ▷ **ADJ**, TR 9:00-9:50, Robert "Bob" Krueger
- ▷ **ADK**, TR 10:00-10:50, Sarah Simpson
- ▷ **ADL**, TR 11:00-11:50, Rocco Davino
- ▷ **ADM**, TR 12:00-12:50, Dara Zirlin
- ▷ **ADN**, TR 1:00-1:50, John "Connor" Grady
- ▷ **ADO**, TR 2:00-2:50, Shuyu "Sonya" Xiao
- ▷ **ADQ**, TR 10:00-10:50, Saaber Pourmotabbed
- ▷ **ADR**, TR 9:00-9:50, Scott Harman
- ▷ **ADS**, TR 12:00-12:50, Rocco Davino
- ▷ **ADT**, TR 2:00-2:50, Ryan McConnell
- ▷ **ADU**, TR 3:00-3:50, Shuyu "Sonya" Xiao
- ▷ **ADW**, TR 8:00-8:50, Robert "Bob" Krueger

- 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.

310	311	312	R	313	314	315	316	317	318	—	—	319	320	321	322	323	R	324	325	326
291	292	293	Q	294	295	296	297	298	299	300	301	302	303	304	305	306	Q	307	308	309
272	273	274	P	275	276	277	278	279	280	281	282	283	284	285	286	287	P	288	289	290
253	254	255	O	256	257	258	259	260	261	262	263	264	265	266	267	268	O	269	270	271
234	235	236	N	237	238	322	240	241	242	243	244	245	246	247	248	249	N	250	251	252
216	217	218	M	219	220	221	222	223	224	225	226	227	228	229	230		M	231	232	233
199	200	201	L	202	203	204	205	206	207	208	209	210	211	212	213		L	214	215	216
181	182	183	K	184	185	186	187	188	189	190	191	192	193	194	195		K	196	197	198
163	164	165	J	166	167	168	169	170	171	172	173	174	175	176	177		J	178	179	180
145	146	147	I	148	149	150	151	152	153	154	155	156	157	158	159		I	160	161	162
127	128	129	H	130	131	132	133	134	135	136	137	138	139	140	141		H	142	143	144
109	110	111	G	112	113	114	115	116	117	118	119	120	121	122	123		G	124	125	126
91	92	93	F	94	95	96	97	98	99	100	101	102	103	104	105		F	106	107	108
73	74	75	E	76	77	78	79	80	81	82	83	84	85	86	87		E	88	89	90
55	56	57	D	58	59	60	61	62	63	64	65	66	67	68	69		D	70	71	72
38	39	40	C	41	42	43	44	45	46	47	48	49	50	51			C	52	53	54
21	22	23	B	24	25	26	27	28	29	30	31	32	33	34			B	35	36	37
5	6	7	A	8	9	10	11	12	13	14	15	16	17				A	18	19	20
	1	2																3	4	

FRONT OF ROOM – 141 Wohlers Hall

1. (10 points) Let $f(x) = 5x - 21x^2$.

   Use the definition of a derivative as a limit to prove that $f'(x) = 5 - 42x$.

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

2. (10 points) Determine all values of x which satisfy the equation below.

$$3\ln(5) + e^{2\ln(4-3x)} = \ln\left(125e^{241-24x}\right)$$

3. (10 points) Find an equation for each horizontal asymptote on the graph of the function $f(x)$.

$$f(x) = \begin{cases} 20\arctan(x) + 52\pi & \text{if} \quad x < 0 \\ \\ 80e^{-2x} - 5 & \text{if} \quad x \geq 0 \end{cases}$$

4. (10 points) The function $f(x) = 4e^{8x} - 2x + 1$ has derivative $f'(x) = 32e^{8x} - 2$.
Determine a formula for the line which is tangent to the graph of $f(x)$ at its y-intercept.

5. (10 points) The function $R(x) = \dfrac{9e^{3x}}{5 + 2e^{3x}}$ is one-to-one. Find a formula for its inverse $R^{-1}(x)$.

6. (10 points) Use interval notation to state the domain of the given function.

$$f(x) = \frac{\cos\left(x^2 - 121\right)}{x - \sqrt{42 - x}}$$

7. (8 points each) Evaluate the following limits and write your answers in simplified form. For infinite limits, you must clearly show whether the limit is ∞ or $-\infty$. We will learn l'Hospital's Rule and other shortcuts for obtaining limits later. For now you are not allowed to use these approaches.

   (a) $\lim_{x \to \infty} \dfrac{8 + 9x^{1/6}}{2x^{1/6} + 3}$

(b) $\lim_{x \to \infty} \dfrac{8 \sin(x) + 20}{x^{42}}$

(c) $\lim_{x \to 9/5} \dfrac{25x^2 - 81}{5x - 9}$

(d) $\lim_{x \to 196^-} \dfrac{\sqrt{x}+7}{\sqrt{x}-7}$

(e) $\lim_{x \to 8^+} \dfrac{9e^{-5x}}{\ln(8/x)}$

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) _____

7a. (8 points) _____

7b. (8 points) _____

7c. (8 points) _____

7d. (8 points) _____

7e. (8 points) _____

TOTAL (100 points) _____