MATH 220 **Test 2** **Spring 2019**

Name _____ **NetID** _____

UIN _____

Circle your TA discussion section.

- ▷ **AD1**, TR 9:00-10:50, Ran Ji
- ▷ **AD2**, TR 1:00-2:50, Cassie Christenson
- ▷ **AD3**, TR 11:00-12:50, Dana Neidinger
- ▷ **ADA**, TR 8:00-8:50, Eion Blanchard
- ▷ **ADB**, TR 9:00-9:50, Eion Blanchard
- ▷ **ADC**, TR 10:00-10:50, Yuxuan "Yuki" Zhang
- ▷ **ADD**, TR 11:00-11:50, Stathis Chrontsios
- ▷ **ADE**, TR 12:00-12:50, Kesav Krishnan
- ▷ **ADF**, TR 1:00-1:50, Souktik Roy
- ▷ **ADG**, TR 2:00-2:50, Gidon Orelowitz
- ▷ **ADH**, TR 3:00-3:50, Mina Nahvi
- ▷ **ADJ**, TR 9:00-9:50, Yuxuan "Yuki" Zhang
- ▷ **ADK**, TR 10:00-10:50, Souktik Roy
- ▷ **ADL**, TR 11:00-11:50, Gidon Orelowitz
- ▷ **ADM**, TR 12:00-12:50, Vincent Villalobos
- ▷ **ADN**, TR 1:00-1:50, Kesav Krishnan
- ▷ **ADO**, TR 2:00-2:50, Stathis Chrontsios
- ▷ **ADQ**, TR 4:00-4:50, Mina Nahvi
- ▷ **ADR**, TR 10:00-10:50, Vincent Villalobos

- Sit in your assigned seat (circled below).
- Do not open the test or write formulas upon it until I say *START*.
- Remove smartwatches and turn off all electronic devices.
- 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) Find $w'(x)$ given that $w(x) = 2x^3 + 8\sec(x) + 9\csc(x) + 3\tan(x) + 5\cot(x) + 6e^x + 4\ln(x)$

2. (10 points) Find $g'(x)$ given that $g(x) = \left(\dfrac{x^9+8}{x^4+5}\right)^6$

3. (10 points) Find $f'(x)$ given that $f(x) = \sqrt[4]{\arctan(x^9)}$

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

$$14xy^4 = x^5 + 27y - 81$$

5. (10 points) Suppose that A represents the number of grams of a radioactive substance at time t seconds. Given that $\dfrac{dA}{dt} = -0.125A$, how long does it take 12 grams of this substance to be reduced to 4 grams?

6. (10 points) Determine the absolute minimum y-value on the graph of $y = 4e^{5x} - 60x + 30$.

7. (10 points) A street light is mounted at the top of a 16.5 ft tall pole. Jennifer is 5.5 ft tall. She walks away from the pole with a speed of 8 ft/s along a straight path. How quickly is the length of her shadow on the ground increasing when she is 15 ft from the pole?

8. (10 points) For each $x > 0$, the function $f(x)$ is differentiable and has the following first derivative.

$$f'(x) = \frac{-8\ln(x)}{x^3}$$

(a) Where is the graph of $f(x)$ increasing and where is it decreasing? Use interval notation.

(b) Where is the graph of $f(x)$ concave up and where is it concave down? Use interval notation.

9. (20 points) Circle the correct limit.

(a) $\lim_{x \to 0} \dfrac{e^{12x} - 1}{6x}$

(a) $-\infty$ (b) -2 (c) -1 (d) 0 (e) 1 (f) 2 (g) ∞

(b) $\lim_{x \to 7} \dfrac{e^{x-7} + 1}{13 - 2x}$

(a) $-\infty$ (b) -2 (c) -1 (d) 0 (e) 1 (f) 2 (g) ∞

(c) $\lim_{x \to \infty} \dfrac{2 \ln x}{x^{42}}$

(a) $-\infty$ (b) -2 (c) -1 (d) 0 (e) 1 (f) 2 (g) ∞

(d) $\lim_{x \to \pi} \dfrac{2 \cos x}{(\pi - x)^6}$

(a) $-\infty$ (b) -2 (c) -1 (d) 0 (e) 1 (f) 2 (g) ∞

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. (20 points) _____

TOTAL (100 points) _____