MATH 220 **Test 3** **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) Evaluate the indefinite integral.

$$\int \left(91x^6 + 6\sin x + 5\sec^2 x + 9\csc^2 x + 8e^x + 4\right)\, dx$$

2. (10 points) Evaluate the indefinite integral.

version 1: $\int \sin^{80}(x)\cos^3(x)\, dx$

version 2: $\int \cos^{60}(x)\sin^3(x)\, dx$

3. (10 points) Evaluate the indefinite integral.

$$\int 225x\,(15x+4)^{28}\,dx$$

4. (10 points) Evaluate the indefinite integral.

$$\int \frac{8000x^{79}}{x^{160}+400}\,dx$$

5. (10 points) Find the average value of the function $f(x) = 40x^3e^{x^4}$ on the interval $[0, 5]$. Simplify your answer.

6. (10 points)

version 1: Determine the x-coordinate for the absolute maximum value of the following function.

$$g(x) = \int_6^{80x-5x^2} \left(\frac{1}{\sin^{20}(t) + 400} \right) dt$$

version 2: Determine the x-coordinate for the absolute minimum value of the following function.

$$g(x) = \int_9^{6x^2-132x} \left(\frac{1}{\cos^{40}(t) + 100} \right) dt$$

7. (10 points) Evaluate the following limit. Be sure to use proper notation throughout your evaluation of this limit. Simplify your answer.

$$\lim_{n\to\infty} \sum_{k=1}^{n} \left(\frac{4 + 18kn^4}{n^6} \right)$$

8. (10 points) Suppose that $f(x)$ is a polynomial which satisfies the following conditions.

- $\int_5^{129} f(x)\,dx = 30$
- $\int_{42}^{129} f(x)\,dx = 38$

Evaluate the following quantities.

(a) $\int_5^{42} (2f(x) + 10)\ dx$

(b) $\int_1^5 6x^2 f\left(x^3 + 4\right)\ dx$

9. (10 points) Let $\mathbf{R}$ be the finite region bounded by the graphs of $y = 12x^2$ and $y = 48x$. These curves intersect at the origin and at the point $(x, y) = (4, 192)$. Revolve $\mathbf{R}$ around the horizontal line $y = 220$ to form a solid. In the following manner, set up <u>but do not evaluate</u> definite integrals which represent the volume of the solid. Use proper notation.

   (a) Integrate with respect to x.

   (b) Integrate with respect to y. (The integrands in parts (a) and (b) should be different.)

10. (10 points) Given the function below, use a linear approximation to estimate $g(1.03)$. Simplify and write your answer in decimal form.

$g(x) = 20\ln(x) - 8e^{x^2-1}$

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. (10 points) _____
10. (10 points) _____

TOTAL (100 points) _____