MATH 220   **Test 3**   **Fall 2018**

Name ———————————————————————   **NetID** ————————————————

                                                              UIN ————————————————

Circle your TA discussion section.

- ▷ **AD1**, TR 11:00-12:50, Adriana Morales
- ▷ **AD2**, TR 9:00-10:50, Hannah Burson
- ▷ **AD3**, TR 1:00-2:50, Dana Neidinger
- ▷ **ADA**, TR 8:00-8:50, Gayana Jayasinghe
- ▷ **ADB**, TR 9:00-9:50, Felix Clemen
- ▷ **ADC**, TR 10:00-10:50, Lutian Zhao
- ▷ **ADD**, TR 11:00-11:50, Gidon Orelowitz
- ▷ **ADE**, TR 12:00-12:50, Josh Wen
- ▷ **ADF**, TR 1:00-1:50, Nachiketa Adhikari
- ▷ **ADG**, TR 2:00-2:50, Lutian Zhao
- ▷ **ADH**, TR 3:00-3:50, Stathis Chrontsios
- ▷ **ADI**, TR 4:00-4:50, Stathis Chrontsios

- ▷ **ADJ**, TR 9:00-9:50, Gayana Jayasinghe
- ▷ **ADK**, TR 10:00-10:50, Madina Bolat
- ▷ **ADL**, TR 11:00-11:50, Chris Loa
- ▷ **ADM**, TR 12:00-12:50, Heeyeon Kim
- ▷ **ADN**, TR 1:00-1:50, Josh Wen
- ▷ **ADO**, TR 2:00-2:50, Kesav Krishnan
- ▷ **ADQ**, TR 10:00-10:50, Felix Clemen
- ▷ **ADR**, TR 9:00-9:50, Madina Bolat
- ▷ **ADS**, TR 12:00-12:50, Chris Loa
- ▷ **ADT**, TR 2:00-2:50, Nachiketa Adhikari
- ▷ **ADU**, TR 3:00-3:50, Kesav Krishnan
- ▷ **ADZ**, TR 9:00-9:50, Gidon Orelowitz

- 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.

	◇	◇	◇	◇												R1	R2	R3		
	Q1	Q2	Q3	Q4		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9		Q1	Q2	Q3	Q4	
	P1	P2	P3	P4		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	N1	N2	N3	N4	N5
M1	M2	M3	M4	M5		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M1	M2	M3	M4	M5
L1	L2	L3	L4	L5		L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L1	L2	L3	L4	L5
K1	K2	K3	K4	K5		K1	K2	K3	K4	K5	K6	K7	K8	K9	K10	K1	K2	K3	K4	K5
J1	J2	J3	J4	J5		J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J1	J2	J3	J4	J5
H1	H2	H3	H4	H5		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H1	H2	H3	H4	H5
G1	G2	G3	G4	G5		G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G1	G2	G3	G4	G5
F1	F2	F3	F4	F5		F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F1	F2	F3	F4	F5
E1	E2	E3	E4	E5		E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E1	E2	E3	E4	E5
D1	D2	D3	D4	D5		D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D1	D2	D3	D4	D5
C1	C2	C3	C4	C5		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C1	C2	C3	C4	C5
B1	B2	B3	B4	B5		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B1	B2	B3	B4	B5
A1	◇	◇	◇	◇												◇	◇	◇	◇	A5

FRONT OF ROOM – 114 David Kinley Hall

1. (10 points) Evaluate the indefinite integral.

$$\int \left(x^9 + 6\sin\left(x\right) + 4\cos\left(x\right) + 2\csc\left(x\right)\cot\left(x\right) + 8\sec\left(x\right)\tan\left(x\right) + 5\csc^2\left(x\right) + 9\sec^2\left(x\right) + 3 \right)\, dx$$

2. (10 points) Evaluate the definite integral. Simplify your answer.

$$\int_5^{11} \left((x-8)^{95}\cos\left(x-8\right) + (x-8)^{84}\sin\left(x-8\right) + 3(x-8)^2 - 2 \right)\, dx$$

3. (10 points) Evaluate the indefinite integral.

$$\int \frac{128x}{(8x+3)^2}\, dx$$

4. (10 points) Evaluate the indefinite integral.

version 1: $\int \tan^3(x)\sec^{65}(x)\, dx$ version 2: $\int \sec^4(x)\tan^{84}(x)\, dx$

5. (10 points) Evaluate the indefinite integral.

$$\int \frac{x^{29} + 240x^{14}}{x^{30} + 64} \, dx$$

6. (10 points) The points $(0, 3)$ and $(1, 10)$ are on the graph of a function $f(x)$ which has second derivative $f''(x) = 30x - 12$. Determine a formula for $f(x)$.

7. (10 points) Let $f(x) = 7e^{0.2x} + 35\cos(5x)$. Use a linear approximation to estimate $f(0.3)$. Simplify and write your answer in decimal form.

8. (10 points) Evaluate the following limit. Be sure to use proper notation throughout your evaluation of this limit. Simplify your answer.

$$\lim_{n\to\infty} \sum_{k=1}^{n} \left(\frac{60k + 12n}{n^2} \right)$$

9. (10 points) Suppose $g(x) = \int_8^{x^2-84x} (t+320)^{22} e^{t^5} dt$.

(a) Find $g'(x)$.

(b) Determine each critical number of $g(x)$.

(c) At which critical number does $g(x)$ have an absolute extreme value? Is it an absolute maximum or an absolute minimum?

10. (10 points) Let **R** be the finite region bounded by the graphs of $y = 20/x$ and $y = -2x + 14$. These graphs intersect at the points $(2, 10)$ and $(5, 4)$. Set up but do not evaluate definite integrals which represent the following quantities. For each problem you should integrate with respect to x.

(a) The area of **R**

(b) The volume of the solid formed when **R** is revolved around the vertical line $x = 7$

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) ⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯