MATH 220 **Test 3** **Spring 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 9:00-10:50, Nick Andersen
▷ **AD2**, TR 1:00-2:50, Sarah Loeb
▷ **ADA**, TR 8:00-8:50, Lisa Hickok
▷ **ADB**, TR 9:00-9:50, Sneha Chaubey
▷ **ADC**, TR 10:00-10:50, Sneha Chaubey
▷ **ADD**, TR 11:00-11:50, Tom Mahoney
▷ **ADE**, TR 12:00-12:50, Tom Mahoney
▷ **ADF**, TR 1:00-1:50, Lisa Hickok
▷ **ADG**, TR 2:00-2:50, Nathan Rehfuss
▷ **ADH**, TR 3:00-3:50, Nathan Rehfuss
▷ **ADJ**, TR 9:00-9:50, Dan Schultz
▷ **ADK**, TR 10:00-10:50, Dan Schultz
▷ **ADL**, TR 11:00-11:50, Derrek Yager
▷ **ADM**, TR 12:00-12:50, Derrek Yager
▷ **ADN**, TR 1:00-1:50, Ben Fulan
▷ **ADO**, TR 2:00-2:50, Ben Fulan
▷ **ADP**, TR 3:00-3:50, Mahmood Etedadi Aliabadi
▷ **ADQ**, TR 4:00-4:50, Mahmood Etedadi Aliabadi

	◇	◇	◇	◇	
	Q2	Q3	Q4	Q5	
	P2	P3	P4	P5	
N1	N2	N3	N4	N5	
M1	M2	M3	M4	M5	
L1	L2	L3	L4	L5	
K1	K2	K3	K4	K5	
J1	J2	J3	J4	J5	
H1	H2	H3	H4	H5	
G1	G2	G3	G4	G5	
F1	F2	F3	F4	F5	
E1	E2	E3	E4	E5	
D1	D2	D3	D4	D5	
C1	C2	C3	C4	C5	
B1	B2	B3	B4	B5	
A1	◇	◇	◇	◇	

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9		
P1	P2	P3	P4	P5	P6	P7	P8	P9		
N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	
M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	
L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	
K1	K2	K3	K4	K5	K6	K7	K8	K9	K10	
J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	
H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	
G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	
F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	
E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	
D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	
C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	
A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	

R1	R2	R3		
Q1	Q2	Q3	Q4	
P1	P2	P3	P4	P5
N1	N2	N3	N4	N5
M1	M2	M3	M4	M5
L1	L2	L3	L4	L5
K1	K2	K3	K4	K5
J1	J2	J3	J4	J5
H1	H2	H3	H4	H5
G1	G2	G3	G4	G5
F1	F2	F3	F4	F5
E1	E2	E3	E4	E5
D1	D2	D3	D4	D5
C1	C2	C3	C4	C5
B1	B2	B3	B4	B5
◇	◇	◇	◇	A5

FRONT OF ROOM – 114 David Kinley Hall

1. (8 points) Evaluate the following indefinite integrals.

   (a) $\int \sin x \, dx$

   (b) $\int \cos x \, dx$

   (c) $\int \frac{1}{x} \, dx$

   (d) $\int e^x \, dx$

   (e) $\int \sec^2 x \, dx$

   (f) $\int \csc^2 x \, dx$

   (g) $\int \sec x \tan x \, dx$

   (h) $\int \csc x \cot x \, dx$

2. (8 points) Evaluate the definite integral. Simplify your answer.

$$\int_{-2}^{2} \left(x^{25} + 4x^5 + 3x^2 + 5\right) \, dx$$

3. (8 points) Evaluate the definite integral. Simplify your answer.

$$\int_0^{1/2} \frac{6}{4x^2+1}\,dx$$

4. (8 points) Evaluate the indefinite integral.

$$\int 10x^9 \left(x^5+3\right)^{100}\,dx$$

5. (8 points) Evaluate the indefinite integral.

$$\int x^3 \tan^2\left(x^4\right) dx$$

6. (10 points) Evaluate the indefinite integral.

$$\int \sin^3 x \cos^{15} x \, dx$$

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

$$\lim_{n\to\infty} \sum_{k=1}^{n} \left(\frac{10k}{n^2} + \frac{3}{n+2} \right)$$

8. (8 points) Let $g(x) = \int_2^{x^3-12x} e^{t^2}\, dt$. At which value of x does $g(x)$ have a local minimum?

9. (12 points) Let **R** be the finite region bounded by the x-axis, the y-axis, and the line $2x + 5y = 10$. Revolve **R** around the vertical line $x = 8$ to form a solid. In the following manner, set up but do not evaluate definite integrals which represent the volume of the solid.

   (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) In order to approximate $\sqrt{26.6}$, begin with an initial estimate of $x_1 = 5$ and use Newton's Method to obtain a second estimate x_2. Simplify your final answer.

11. (10 points) A stone was dropped off a cliff and hit the ground with a speed of 160 ft/s. What is the height of the cliff?

Students – do not write on this page!

1. (8 points) _____
2. (8 points) _____
3. (8 points) _____
4. (8 points) _____
5. (8 points) _____
6. (10 points) _____
7. (10 points) _____
8. (8 points) _____
9. (12 points) _____
10. (10 points) _____
11. (10 points) _____

TOTAL (100 points) _____