AL1 (MWF 11:00-11:50) AL2 (MWF 1:00-1:50) AL3 (MWF 3:00-3:50)

MATH 220 **Test 3** **Spring 2015**

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, Andrew McConvey
▷ **AD2**, TR 1:00-2:50, Derrek Yager
▷ **ADA**, TR 8:00-8:50, Mi Young Jang
▷ **ADB**, TR 9:00-9:50, Stephen Berning
▷ **ADC**, TR 10:00-10:50, Sarah Yeakel
▷ **ADD**, TR 11:00-11:50, Michael Livesay
▷ **ADE**, TR 12:00-12:50, George Shakan
▷ **ADF**, TR 1:00-1:50, Albert Tamazyan
▷ **ADG**, TR 2:00-2:50, Alonza Terry
▷ **ADH**, TR 3:00-3:50, Alonza Terry
▷ **ADJ**, TR 9:00-9:50, Mi Young Jang
▷ **ADK**, TR 10:00-10:50, Stephen Berning
▷ **ADL**, TR 11:00-11:50, Adam Wagner
▷ **ADM**, TR 12:00-12:50, Adam Wagner
▷ **ADN**, TR 1:00-1:50, Mychael Sanchez
▷ **ADO**, TR 2:00-2:50, Mychael Sanchez
▷ **ADP**, TR 3:00-3:50, Albert Tamazyan
▷ **ADQ**, TR 4:00-4:50, George Shakan
▷ **ADR**, TR 9:00-9:50, Michael Livesay

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1	2	3	4	5	6	D	D	1	2	3	4	5	6	7	8	9	10	11	12	13	D	D	1	2	3	4	5	6	
1	2	3	4	5	6	C	C	1	2	3	4	5	6	7	8	9	10	11	12	13	C	C	1	2	3	4	5	6	
1	2	3	4	5	6	B	B	1	2	3	4	5	6	7	8	9	10	11	12	13	B	B	1	2	3	4	5	6	
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FRONT OF ROOM – 100 Materials Science and Engineering Building

1. (5 points) Suppose that a polynomial $f(x)$ satisfies the following conditions.

   - $f(4) = 8$
   - $f'(4) = 3$
   - $f''(4) = 6$
   - $f'''(4) = 2$

   Use a linear approximation to estimate the value of $f(3.8)$. Simplify and write your answer in decimal form.

2. (5 points) Fill in the missing information to show that the area between the x-axis and the graph of $f(x) = \dfrac{1}{x^2+1}$ on the interval $[-2, 2]$ can be expressed as the limit of a right Riemann sum. The only variables appearing in your limit should be n and k. Do not evaluate this limit.

$$AREA = \lim_{n\to\infty} \sum_{k=1}^{n} \Bigg[\qquad\qquad\qquad\qquad\qquad\qquad \Bigg]$$

3. (10 points) Let $g(x) = \int_{x^5}^{4} \sin\left(t^2\right) dt$. Find $g'(x)$.

4. (10 points) Some of the values of a polynomial $f(x)$ are shown in the table. If $g(x) = 8xf'(x^2)$, then find the average value of $g(x)$ on the interval $[0, 2]$. Simplify your answer.

x	$f(x)$
0	3
1	5
2	8
3	13
4	21
5	34
6	55
7	89
8	144
9	233

5. (10 points) There are currently 400 rabbits living on an island. A biologist uses a model which predicts that the population will increase by $2t + 5$ rabbits per year where t represents the number of years from today. According to the biologist's model, how many rabbits will be living on the island 10 years from now?

6. (10 points) Evaluate the definite integral. Simplify your answer.

$$\int_1^3 \frac{2x}{x^2 + 1}\, dx$$

7. (10 points) Evaluate the indefinite integral.

$$\int \frac{\sin^2 x}{\sec x \csc^4 x}\, dx$$

8. (10 points) Evaluate the indefinite integral.

$$\int \cot^{16} x \csc^4 x\, dx$$

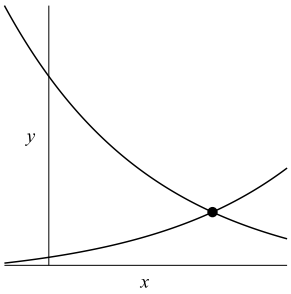
9. (10 points) Evaluate the indefinite integral.

$$\int 4x^7 \left(x^4 + 1\right)^{15} \, dx$$

10. (10 points) Evaluate the indefinite integral.

$$\int \frac{5x^2 + 1}{x^2 + 1} \, dx$$

11. (10 points) The graphs of $y = 2e^x$ and $y = 18e^{-x}$ are shown along with their point of intersection $(x, y) = (\ln 3, 6)$. Let $\mathbf{R}$ be the finite region bounded by these two curves and the y-axis. By integrating with respect to x, set up, but do not evaluate, definite integrals which represent the given quantities.



(a) The volume of the solid obtained when $\mathbf{R}$ is revolved around the vertical line $x = -2$.

(b) The volume of the solid obtained when $\mathbf{R}$ is revolved around the horizontal line $y = 22$.

Students – do not write on this page!

1. (5 points) _____
2. (5 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) _____
11. (10 points) _____

TOTAL (100 points) _____