MA 2411 Spring 2008 UNIFORM FINAL

Name: ____________________________________

Circle Your Section Number:

001	002	003
Olson	Russo	Lana
M/W 9:00-10:50	M/W 5:00-6:50	T/TH 1:00-2:50

Instructions:

- **Put your name on this page and the next. You should have 8 pages of this test.**
- **Circle your Section Number Above.**
- **Scratch paper will be provided. No notes or calculator will be allowed on this exam.**
- **If you are unclear what a problem is asking, then talk to your instructor for clarification. You may not ask for hints, verification of formulas, or if you have done the problem correctly. This exam is over what YOU know to date.**
- **Be neat. If the grader cannot understand what you have recorded, you will not get credit.**

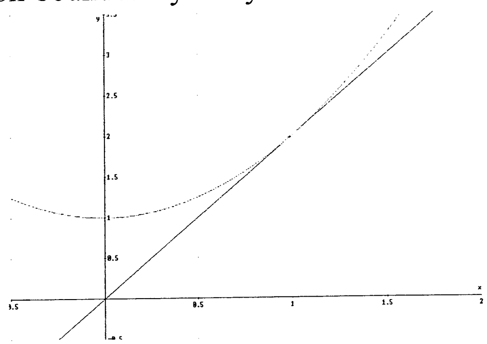
DO NOT WRITE BELOW THIS LINE

Page 1 (15 points)	Page 2 (17 points)	Page 3 (18 points)	Page 4 (11 points)	Page 5 (17 points)
Page 6 (24 points)	Page 7 (18 points)	Page 8 (14 points)	Page 9 (16 points)	X

Total: ________________ (Out of 150 Points)

CALCULUS II: MA 2411
FINAL EXAM SPRING 2008 **NAME:**__________________ **SCORE:** ___________**/150**

1. Let R be the region bounded by the y-axis and the functions $y = 2x$ and $y = x^2 + 1$ as shown below.



a. (5 points). Set up and evaluate the integral to find the area of R.

b. (5 points). Set up **but do not evaluate** the integral to find the volume of the solid formed by rotating the region R about the x-axis. Also sketch a graph of the resulting solid.

2. (5 points). Set up **but do not evaluate** the integral to find the volume of the solid formed by rotating the region bounded by the y-axis, $y = 2$ and $y = \sqrt{x}$ about the line $y = 3$. Also sketch a graph of the resulting solid.

5. (6 points each). Evaluate the following integrals. Show all of your work.

a) $\int \frac{3x^2 - 7x - 2}{x^3 - x} dx$

b) $\int \frac{x^3}{\sqrt{4 - x^2}} dx$

c) $\int x \sin(x) dx$

7. (6 points). Find the particular solution to the differential equation $\frac{dy}{dx} = \frac{ye^{3x}}{y^2 - 1}$, that satisfies the initial condition $y(0) = 1$. (You do not need to solve your answer for y).

8. (6 points). Evaluate the following improper integral. Show all work.

$$\int_1^3 \frac{1}{\sqrt{x-1}} dx$$

Series Tests		
1. nth Term Test	3. Ratio Test	6. Integral Test
2. Special Series Tests:	4. Limit Comparison Test	7. Alternating Series Test
a) Geometric Series	5. Direct Comparison Test	8. Root Test
b) p-series		

9. (5 points). Determine if the sequence $\left\{ \frac{5n^4 - 2}{4n^4 + 5} \right\}$ converges or diverges. If it converges, determine the value that it converges to.

11. (5 points). Determine if the following geometric series is convergent or divergent. If it is a convergent series find its sum.

$$\frac{1}{5}-\frac{\pi}{25}+\frac{\pi^2}{125}-\frac{\pi^3}{625}+\ldots$$

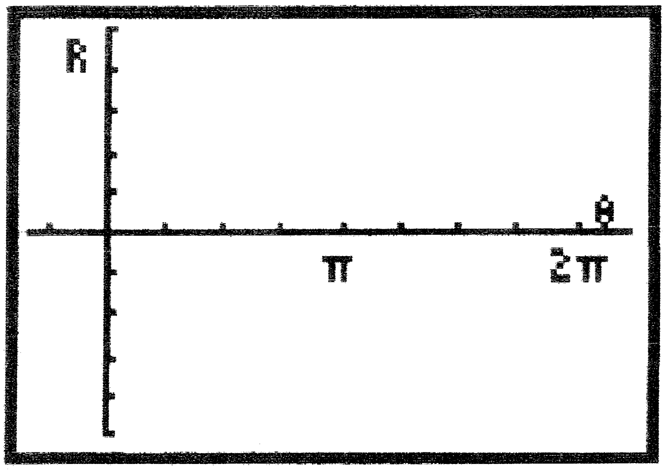
12. (6 points). Determine whether the alternating series $\sum_{k=1}^{\infty}\frac{(-1)^{k+1}k}{k^2+1}$ is divergent, absolutely convergent, or conditionally convergent. Show all work.

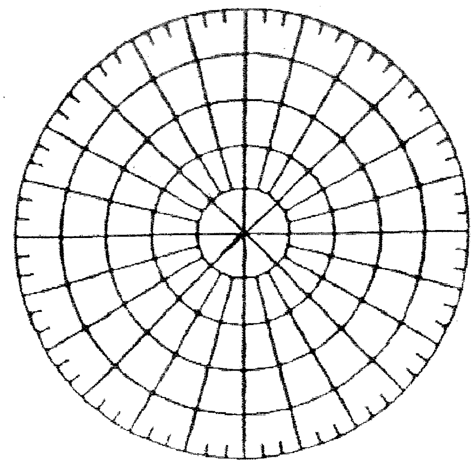
13. (7 points). Determine the interval of convergence for the power series $\sum_{n=0}^{\infty}\frac{2^n(x+3)^n}{n+1}$. Show all work. Don't forget to check the endpoints.

16. (4 points). Convert the point whose rectangular coordinates are ($\sqrt{3}$, 1) to polar coordinates.

(____________, ____________)

17. (6 points). Given the polar equation $2 + 2\cos(\theta)$, first sketch the graph of r as a function of θ in rectangular coordinates. Then use this graph to sketch the corresponding polar curve.





18. (6 points). Given the polar equation $r = 4\cos(\theta)$ shown below. Set up, **but do not evaluate** the integral you would use to find the shaded area of the region shown below.