

NAME: _____

Read all of the following information before starting the exam:

- **WRITE YOUR NAME AT THE TOP OF EACH PAGE** (you will lose points otherwise.)
- **DO NOT WRITE ON THE FRONT OR BACK OF THE FIRST PAGE** other than writing your name.
- Show all work and give explanations where needed. I reserve the right to take off points if I cannot see how you arrived at your answer (even if your final answer is correct).
- Use only the paper provided, your one page notes and a pen or pencil.
- Box your answers if possible.
- This test has 6 problems. and is worth 55 points, It is your responsibility to make sure that you have all of the pages!
- Good luck!

1	
2	
3	
4	
5	
6	
total	

NAME:

1. (13 points)

a) Use partial fractions to re-write $\frac{1}{(x+1)(x+2)}$ as a sum of 2 fractions. Show your work on this problem (like I do in class.)

b) Evaluate $\frac{3}{\ln(2)} \int_0^{\infty} \frac{1}{(x+1)(x+2)} dx$. Your answer should be an integer. Hint: $\ln(M) - \ln(N) = \ln\left(\frac{M}{N}\right)$

NAME:

c) Explain why $\frac{3}{\ln(2)} \int_{-1}^0 \frac{1}{(x+1)(x+2)} dx$ is also an improper integral (do not evaluate this integral.)

d) Does $\sum_{k=0}^{\infty} \frac{1}{(k+1)(k+2)}$ converge or diverge? If it converges state to what.

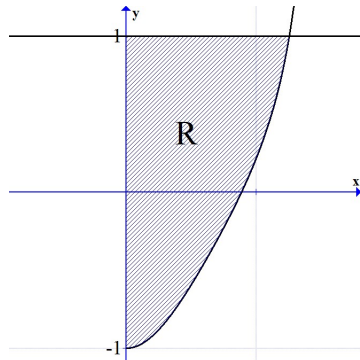
NAME:

2. (5 points) Give the power series representation for $\ln |1 + 2x|$ make sure to give the interval of convergence.

3. (5 points) Solve the differential equation $2y'(t) = 3[y(t)]^2t$ so that $y(1) = -1$

NAME:

4. (8 points) Find the volume of the solid generated by rotating the region R about the y -axis. R is the region bounded by $f(x) = \tan(x^2 - \frac{\pi}{4})$, $x = 0$, and $y = 1$. It may help to remember that $\frac{d}{dx}(\arctan(x)) = \frac{1}{1+x^2}$.



NAME:

5. (16 points) Choose 4 for the following to evaluate. Make it clear which you choose.

a) $\int_0^\pi \sin^3(x) \cos^4(x) dx$

d) $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} x^2 \sin(x) dx$

b) $\int x \sec^2(x) dx$

e) $\int_1^2 x^3 \sqrt{2x^2 - 1} dx$

c) $\int \frac{dx}{(1 + 4x^2)^{\frac{3}{2}}}$

f) $\int_0^1 \frac{2x^2}{(x^2 + 1)(x + 1)} dx$

NAME:

NAME:

6. (8 points) Compute the **DENSITY** of the shape below If it has density function $\rho(x) = z$.

