MATH 2260

Midterm Exam I

February 5, 2013

NAME (please print legibly): _____

Your University ID Number: _____

Please complete all questions in the space provided. Draw a box around your final answer. You may use the backs of the pages for extra space, or ask me for more paper if needed. Work carefully, and neatly (2 points on every problem are given for clear presentation of your work or deducted for unclear, messy, or hard-to-understand work).

Try to complete the problems you find easier before going back to the harder ones. Good luck!

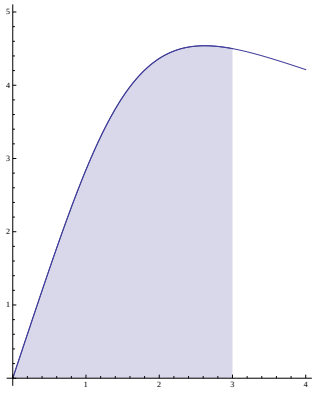
QUESTION	VALUE	SCORE
1	10	
2	10	
3	10	
4	10	
5	10	
6	10	
7	20	
TOTAL	80	

1. (10 points) Find the volume of the solid created by revolving the region bounded by the curves $y = x^2 + 1$ and $y = x + 3$ around the x-axis.

2. (10 points) Consider the area bounded by

$$x = 3, \quad y = \frac{9x}{\sqrt{x^3 + 9}}, \quad y = 0$$

shown in the figure



Compute the volume of the solid created by revolving this area around the **y** axis.

3. (10 points) Set up **BUT DO NOT EVALUATE** the arclength integral for the curve

$$x(t) = (\cos t)^{1/3}, \quad y(t) = (\sin t)^{1/3}$$

for t between 0 and $\pi/2$.

4. (10 points) Find the area of the surface created by rotating $x = y^3/3$ around the y axis for y between 0 and 1.

5. (10 points) In the far future, an overexcited Uga LXVIII ("Bob") pulls his dawghouse for 30 feet down the field in a (noble, but failed) attempt to bite War Eagle CVI. The dawghouse exerts a variable force of

$$f(x) = \cos\frac{x}{10} + 20 \quad \text{(lbs)}$$

on Uga, where x is the number of feet from the original position of the dawghouse. How many ft·lbs of work does Uga do during this journey?

6. (10 points) Find the volume of the solid generated by rotating the region bounded by

$$y = \sqrt{\cos x}, \quad x = 0, \quad x = \pi/2, \quad y = 0$$

around the x axis.

7. (20 points) Set up **BUT DO NOT EVALUATE** the integrals needed to compute the volume swept out by rotating the region bounded by

$$y = x, \quad y = x^2$$

around the x axis by **WASHERS** and by **SHELLS** (10 points each).