

CALCULUS II
Section GH, Fall 2013
Midterm 3
December 4, 2013

STUDENT NAME

- No books, no notes, no calculators and no consultation.
- Show all your work; work not shown does not get credit.
- Use only paper provided; you may use back side.
- There are four questions for a total of 70 points.
- Duration: 55 MINUTES.

Q.1

Q.2

Q.3

Q.4

Total

1.(20 points) Calculate the area bounded by $y = x^2 - 4$ and $y = x + 2$ by two methods: Once integrating with respect to x , and then integrating with respect to y . Draw a graph.

2.(15 points) Calculate the volume of the solid generated by rotating around the y -axis the region bounded by $y = x^2 - x$ and $y = x$. Draw a graph.

3.(20 points) The circle with center at $(2, 0)$ and radius 1 has equation $(x-2)^2 + y^2 = 1$. The disk bounded by this circle is rotated around the y -axis to generate a solid.

(a) Use the disk (washer) method to set up integral(-s) that give the volume of the solid. Do NOT compute the integral(-s), but the variable of integration and the integrand in the same variable should be made explicit as well as the limits of integration.

(b) Use the cylindrical shell method to set up integral(-s) that give the volume of the solid. Do NOT compute the integral(-s), but the variable of integration and the integrand in the same variable should be made explicit as well as the limits of integration.

4.(15 points) Write down an integral that gives the length of the portion of the graph of $y = \ln x$ that lies in the region $-1 \leq y \leq +1$. Do NOT compute the integral, but the integrand, the variable and the limits of the integral must be explicitly noted.