Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date\_\_\_\_\_\_\_\_\_

AP Calculus AB

Area/Volume Project

**1. Find the Area: (No calculator. Show all steps.)**

A. Between  and 

B. Bounded by the region enclosed by: ,  ,  , and 

C. Bounded by  and 

2. Cross Sectional Volume: No Calculator. Show all work on another paper.

|  |  |  |
| --- | --- | --- |
| Region bounded by: | Perpendicular to: | Cross Sectional Shapes |
| A. | Choose:  to x-axis  OR  to y-axis | Square  Semi-Circle |
| B.  x-axis and y-axis | to x-axis  AND  to y-axis | Equilateral Triangle for both |
| C.  x-axis on interval | Choose:  to x-axis  OR  to y-axis | Isosceles Right Triangle (choose)   * Base is hypotenuse * Base is a leg |
| D. Bounded by  and | to y-axis | Choose any shape from above |

Part A. (2 problems)

Choose two different cross sectional shapes, and find both volumes. Choose  axis.

Part B. (2 problems)

Choose any cross sectional shape. Find the volume with sections perpendicular to the x-axis, and perpendicular to the y-axis.

Part C. (1 problem)

Choose  axis and any cross sectional shape.

Part D. (1 problem)

Choose  axis and any cross sectional shape.

(You must have at least 3 different cross sectional shapes.)

**E. MODEL: Choose any ONE problem A-D above, and creaate a 3-D Model on a graph, mounted on card stock. (Materials needed: Craft foam, glue stick, large square graph paper, cardstock.)**

Show:

* Bounded region and  axis info.
* Description, Model of Area of 1 slice
* A(x) or A(y) in terms of proper variable.
* Volume integral
* Correct Solution, with work shown.
* Model: at least 7 (more is better) cross sections (slices) glued on graph paper