Calculus Name _____

Cross Sectional Volume

Write a formula for the area of:

a. Square of side s

b. Equilateral triangle of side s

c. Rectangle

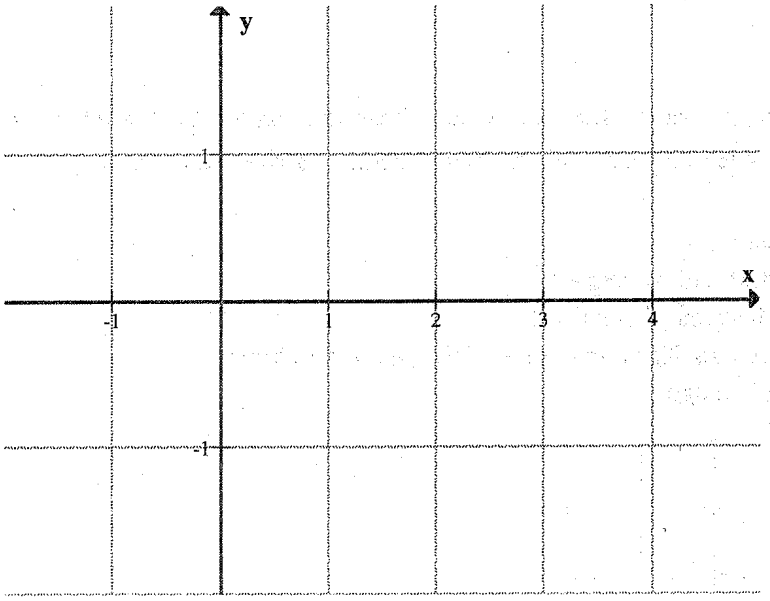
d. Isosceles right triangle with leg s

e. Semi-circle with radius r

Example 1: Emanuel the Duck just bought land with a perimeter set by

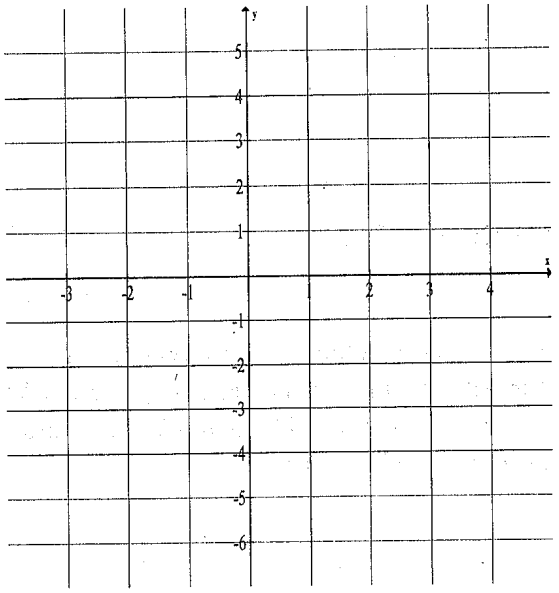
$y = -\frac{1}{3}x^2 + 1$, $x = 0$ and $y = 0$

He plans to build a Biodome, which uses the area described above as a base. The Biodome will be built up so that cross-sections perpendicular to the x-axis will be squares. He wants to know if he will have enough volume in his biodome to have a party with all his friends. He needs 1 cubic mile of space. What is the volume and will he have enough space to entertain his friends?



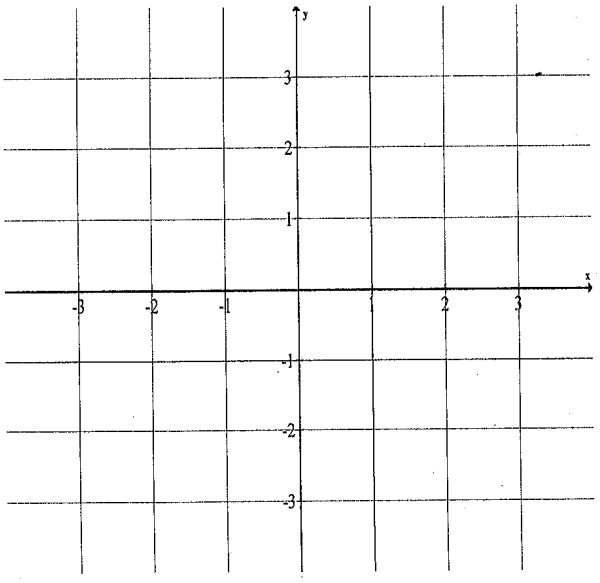
Example 2: Find the volume of the solid whose base is bounded by the equations $y = -x^2 + 4$ and $y = -x - 2$ and whose cross sections taken perpendicular to the x-axis are:

a. Squares
b. Equilateral Triangles
c. Rectangles of height 1
d. Isosceles Right triangles with I leg in the base
e. Semicircles



Example 3: Find the volume of the solid whose base is bounded by the equations $y = -x^2 + 3$ and $y = -1$ and whose cross sections taken perpendicular to the y-axis are:

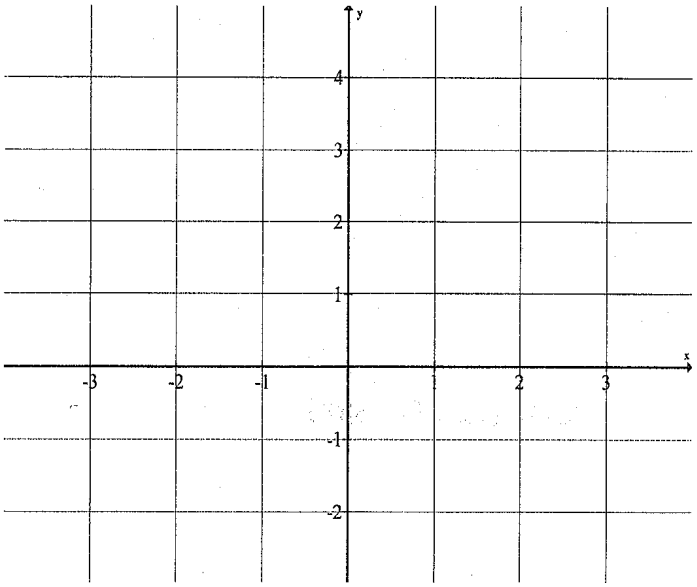
a. Squares
b. Equilateral Triangles
c. Rectangles of height 1
d. Isosceles Right triangles with I leg in the base
e. Semicircles



Homework

Find the volume of the solid whose base is bounded by the graphs of $y = x + 1$ and $y = x^2 - 1$ with the indicated cross sections taken perpendicular to the x-axis.

1. Squares



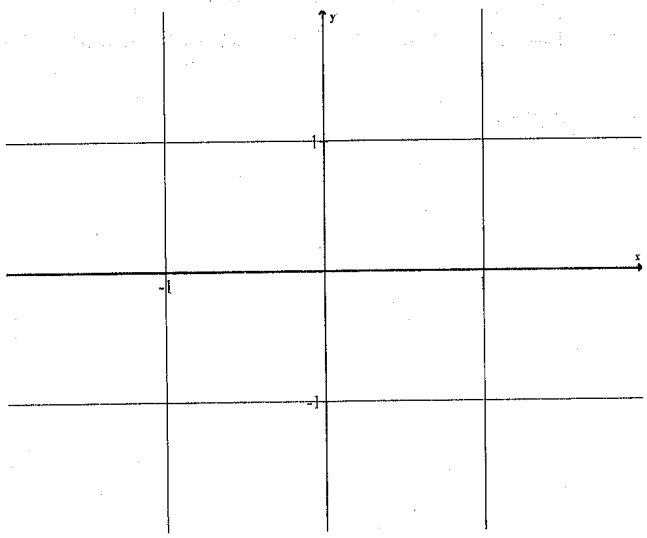
2. Rectangles of height 1

3. Semicircles

4. Equilateral triangles

Find the volume of the solid whose base is bounded by the graphs of $y = x^3$ and $y = 0$ and $x = 1$ with the indicated cross sections taken perpendicular to the y-axis.

5. Squares



6. Rectangles of height 1

7. Semicircles

8. Equilateral triangles