

Name _____

- You have 15 minutes
- No calculators
- Show sufficient work

1. (6 points) Let \mathbf{R} be the finite region bounded by the graphs of $y = x/4$, $y = 2$, and $x = 0$. Set up, but do not evaluate, definite integrals which represent the volumes of the following solids.

(a) The volume of the solid formed when \mathbf{R} is revolved around the horizontal line $y = 3$. Determine this volume in the following two ways.

i. Integrate with respect to x .

ii. Integrate with respect to y . (Use different integrands in parts i and ii .)

- (b) The volume of the solid with base \mathbf{R} for which the cross-sections perpendicular to the x -axis are equilateral triangles.

2. (4 points) Find the average value of the function $f(x) = 4 + \sin(x/4)$ on the interval $[0, 4\pi]$. Simplify your answer.