

Volumes by Disks and Washers (6.3)

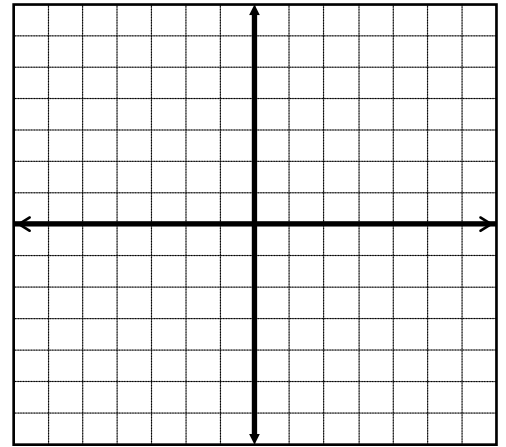
$$A = \int_a^b \pi \left[\left(\begin{array}{c} \text{outer} \\ \text{radius} \end{array} \right)^2 - \left(\begin{array}{c} \text{inner} \\ \text{radius} \end{array} \right)^2 \right] dx, \quad a \leq x \leq b$$

or

$$A = \int_c^d \pi \left[\left(\begin{array}{c} \text{outer} \\ \text{radius} \end{array} \right)^2 - \left(\begin{array}{c} \text{inner} \\ \text{radius} \end{array} \right)^2 \right] dy, \quad c \leq y \leq d$$

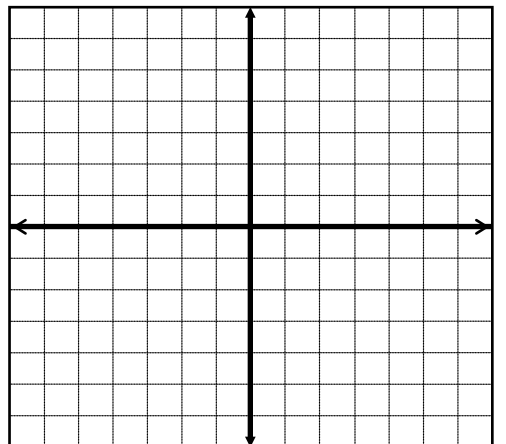
Finding Volumes Using Disks and Washers: *Find the volume using the rotation.*

- 1) Find the volume of the solid region obtained by rotating the region bounded by $y = x^2 - 4x + 5$, $x = 1$, $x = 4$ and the x -axis about the x -axis.

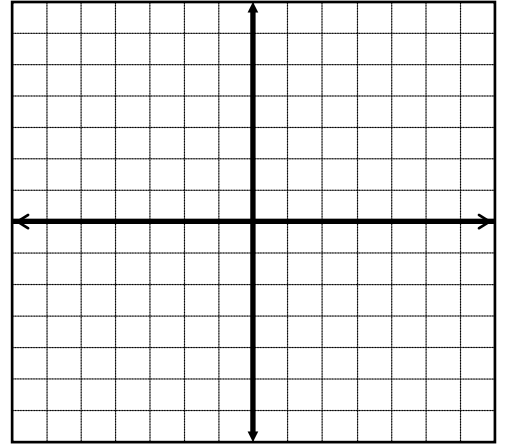


- 2) Find the volume of the solid region obtained by rotating the region bounded by

$$y = \sqrt[3]{x} \text{ and } y = \frac{x}{4} \text{ that lies in the first quadrant about the } y\text{-axis.}$$



- 3) Find the volume of the solid region obtained by rotating the region bounded by $y = x^2 - 2x$ and $y = x$ about the line $y = 4$.



- 4) Find the volume of the solid region obtained by rotating the region bounded by $y = 2\sqrt{x-1}$ and $y = x-1$ about the line $x = -1$.

