

Volumes #3

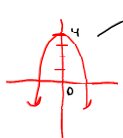
The region in Quadrant I bounded by the parabola $y = 4 - x^2$ is rotated about the y-axis to form a solid paraboloid. Find the volume of this paraboloid if x and y are in inches.

recall $V = \int_a^b \pi [f(x)]^2 dx$



about the y-axis

$dV = \pi x^2 dy$



$\therefore V = \pi \int_0^4 (4 - y) dy$

Solve eqn $y = 4 - x^2$ for x^2

$= \pi [4y - \frac{1}{2}y^2]_0^4$

Integrate

$= \pi [4(4) - \frac{1}{2}(4)^2 - 0]$

$= 8\pi \text{ in}^3$

① Find the volume of the solid generated when the region enclosed by $y = \sqrt{x}$, $y = 2$ and $x = 0$ is revolved about the y-axis $\frac{32\pi}{5}$

② $y = 3 - 2x$ interval $[0, 2]$ $\frac{13\pi}{6}$

③ $y = \frac{1}{x}$ $x = 2$ $y = 2$ $\frac{3\pi}{2}$

④ $x = y^2$ $x = y + 2$ $\frac{72\pi}{5}$

