

Name: _____

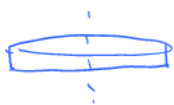
Consider the first-quadrant region bounded by $y = 25 - x^2$, $y = 0$, and $x = 0$.
Revolve the region about the y -axis. Find the volume of the resulting solid.

DISKS $dV = \pi(\text{radius})^2(\text{thickness})$

SHELLS $dV = 2\pi(\text{radius})(\text{height})(\text{thickness})$



DISK METHOD



$$dV = \pi x^2 dy$$

$$\begin{aligned} y &= 25 - x^2 \\ x^2 &= 25 - y \end{aligned}$$

$$dV = \pi(25 - y)dy$$

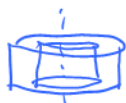
$$V = \pi \int_0^{25} (25 - y) dy$$

$$= \pi \left[25y - \frac{y^2}{2} \right]_0^{25}$$

$$= \pi \left[25^2 - \frac{25^2}{2} - 0 \right]$$

$$= 312.5\pi$$

SHELL METHOD



$$dV = 2\pi x y dx$$

$$= 2\pi x (25 - x^2) dx$$

$$= 2\pi (25x - x^3) dx$$

$$V = 2\pi \int_0^5 (25x - x^3) dx$$

$$= 2\pi \left[\frac{25x^2}{2} - \frac{x^4}{4} \right]_0^5 = 312.5\pi$$