

7.2 Volume by Washer Method:

↳ disk with a hole in it

$$V = \pi \int_a^b [(R(x))^2 - (r(x))^2] dx$$

(*think donut)

a ↓

outer radius

↓

inner radius

Axis of Rotation:

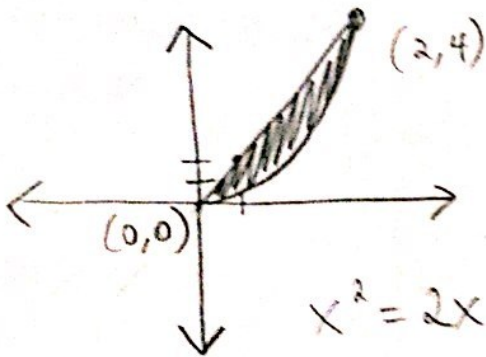
vertical - dy

horizontal - dx

* used when solid is NOT adjacent to axis of rotation

① pic!

$y = x^2$, $y = 2x$ revolved around y -axis. Find volume



$$x = \sqrt{y}$$

$$x = \frac{y}{2}$$

$$x^2 = 2x$$

$$x^2 - 2x = 0$$

$$x(x - 2) = 0$$

$$x = 0, 2$$

$$V = \pi \int_0^4 (\sqrt{y})^2 - \left(\frac{y}{2}\right)^2 dy$$

$$= \pi \int_0^4 \left(y - \frac{1}{4}y^2\right) dy$$

$$= \pi \cdot \left(\frac{y^2}{2} - \frac{y^3}{12} \Big|_0^4\right)$$

$$= \pi \left(8 - \frac{16}{3}\right) = \frac{8\pi}{3}$$