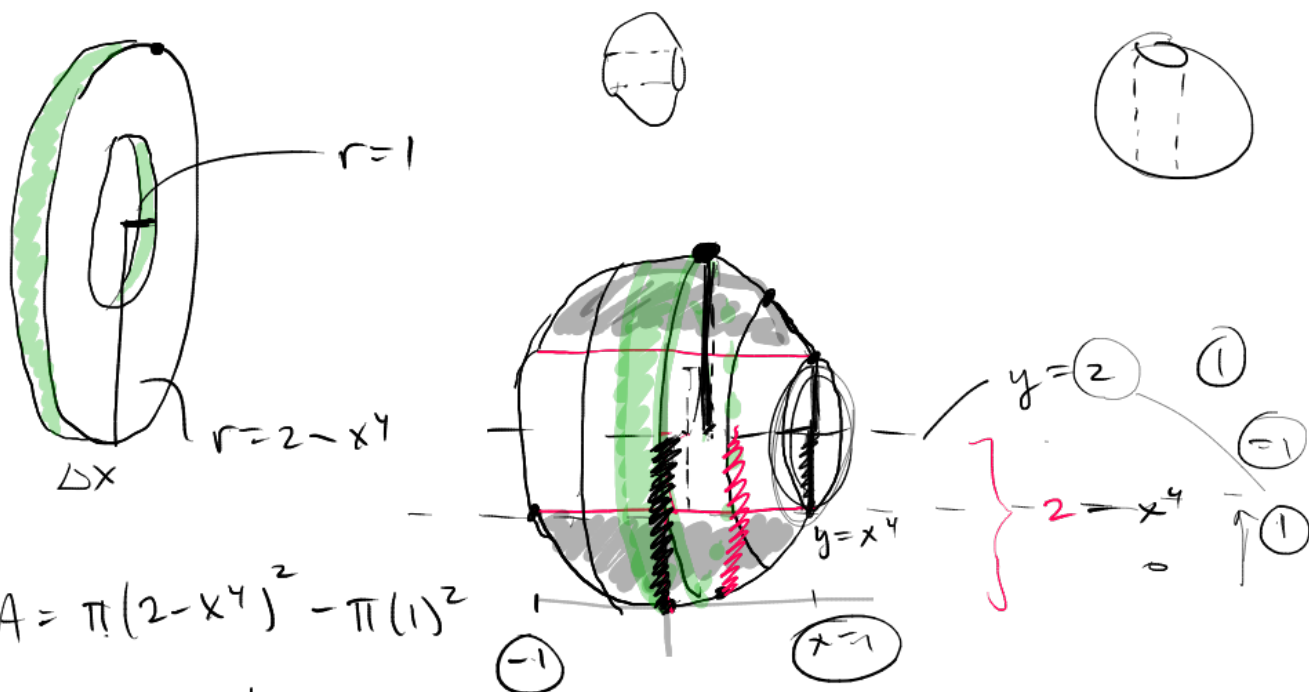




$$A = \pi(2 - x^4)^2 - \pi(1)^2$$

Integrate along x .

Bounds:

$$\pi \int_{-1}^1 (2 - x^4)^2 - 1 \, dx$$

$$\begin{aligned}
 & y = 10 \\
 & r = 9 \\
 & \pi(9)^2
 \end{aligned}$$

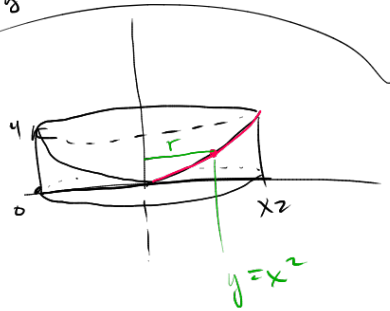
$$\pi \int_{-1}^1 4 - 4x^4 + x^8 - 1 \, dx = \pi \left(4x - \frac{4x^5}{5} + \frac{x^9}{9} - x \right) \Big|_{-1}^1$$

$$= \pi \left[\left(4 - \frac{4}{5} + \frac{1}{9} - 1 \right) - \left(4(-1) + \frac{4}{5} - \frac{1}{9} + 1 \right) \right]$$

$+4 \quad -\frac{4}{5} \quad +\frac{1}{9} \quad -1$

$$= \pi \left[8 - \frac{8}{5} + \frac{2}{9} - 2 \right] =$$

$$y = x^2, y = 0, \underbrace{x=0}_{y=x^2, y=0}, \underbrace{x=2}_{y=x^2, y=4}$$



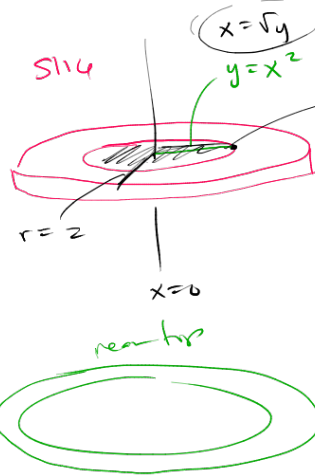
Area:

$$\pi(2)^2 - \pi(\sqrt{y})^2$$

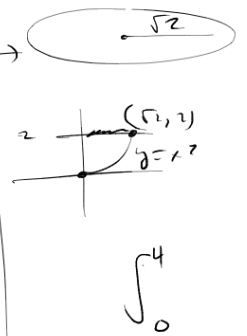
$$4\pi - \pi y = \pi(4-y)$$

$$V = \int_0^4 \pi(4-y) dy = \pi \int_0^4 4-y dy = \pi \left(4y - \frac{y^2}{2} \right) \Big|_0^4 = \pi(16-8) = 8\pi$$

y-axis



slice @ $y=2$.



Average Velocity (Average Value) _____

(#4). Average value of $f(x)$ on $(a, b]$ is

$$\frac{1}{b-a} \int_a^b f(x) dx$$

$$\begin{aligned} \frac{1}{7-5} \int_5^7 3t^{1/2} + 3 dt &= \frac{1}{2} \left(\frac{3t^{3/2}}{3/2} + 3t \right) \Big|_5^7 \\ &= \frac{1}{2} \left[\left(2(7)^{3/2} + 3(7) \right) - \left(2(5)^{3/2} + 3(5) \right) \right] \\ &= \frac{1}{2} \left[58.0405 - 37.3606 \right] \\ &= 10.3395 \end{aligned}$$