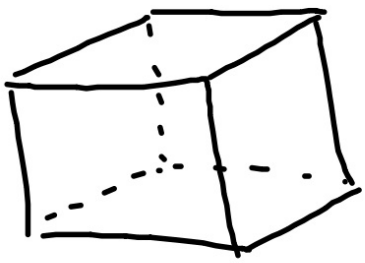
7.2 Volume

WCID? - I can find the volume of a solid



A. $V = s^3$

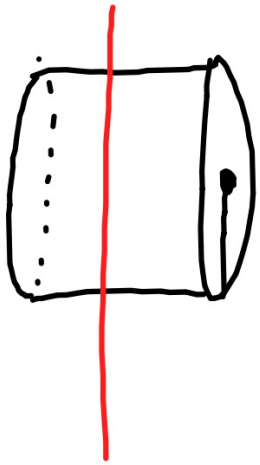
$V = s^2 \cdot s$

s^2 → area of a slice

s → thickness of slice

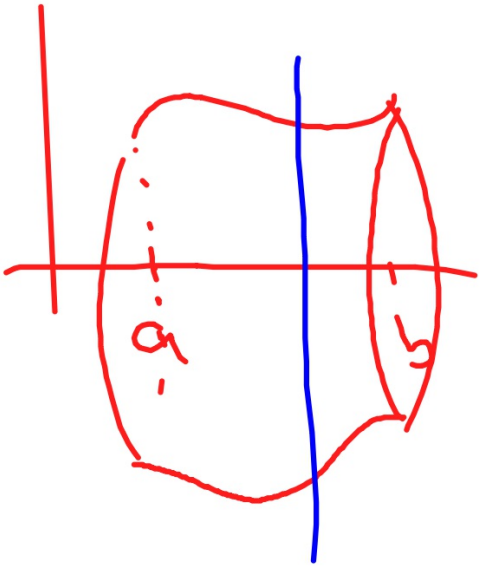
1. Cylinder

$V = \pi r^2 h$



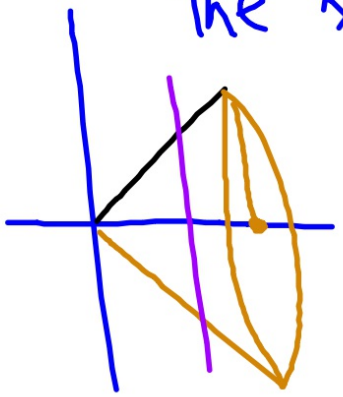
B. Disc Method for Volume - if a function is rotated about the x-axis, the volume obtained is given by

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



$$\pi \int_a^b \left(f(x)\right)^2 dx$$

Ex. Find the volume obtained when $y=x$ is rotated about the x-axis, $[0,1]$

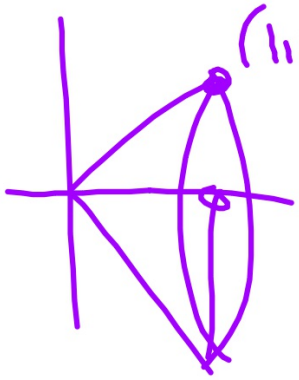


$$V=\pi\int_a^b (f(x))^2\,dx$$

$$V=\pi\int_0^1 x^2\,dx$$

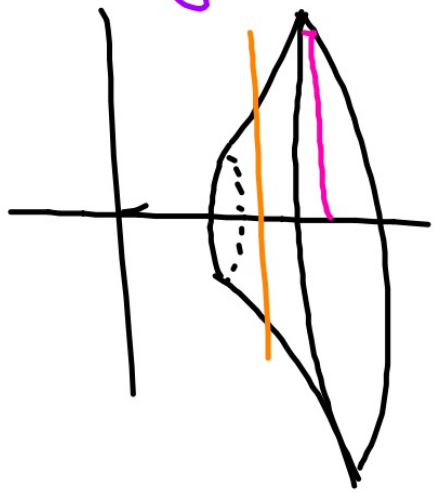
$$\pi\left[\frac{x^3}{3}\Big|_0^1\right]=\pi/3$$

$$V_{cone} = \frac{\pi r^2 h}{3}$$



$$= \pi \frac{(1)^2(1)}{3} = \frac{\pi}{3}$$

Ex. Find volume when $y = x^2$ goes around x-axis, $[2,4]$



$$V = \pi \int_2^4 (x^2)^2 \, dx$$

$$= \pi \int_2^4 x^4 \, dx$$

$$= \pi \left[\frac{x^5}{5} \right]_2^4$$

$$\frac{\pi}{5}\left[1024 - 32\right] = \frac{992\pi}{5}$$