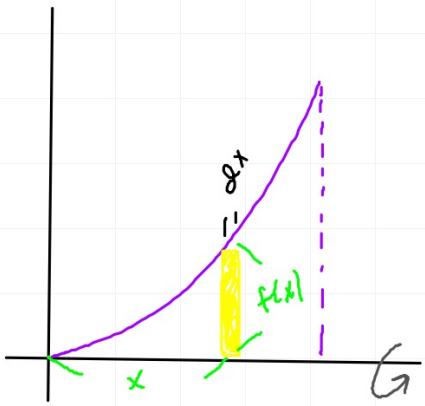
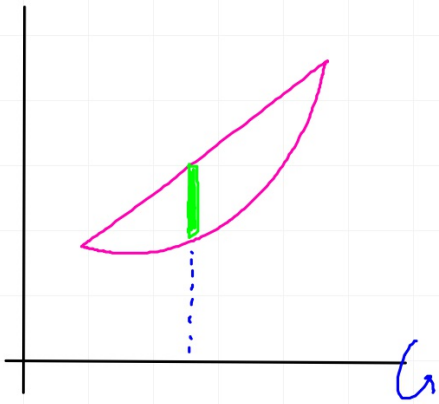
Volumes of Revolution--Disk/Washer Method





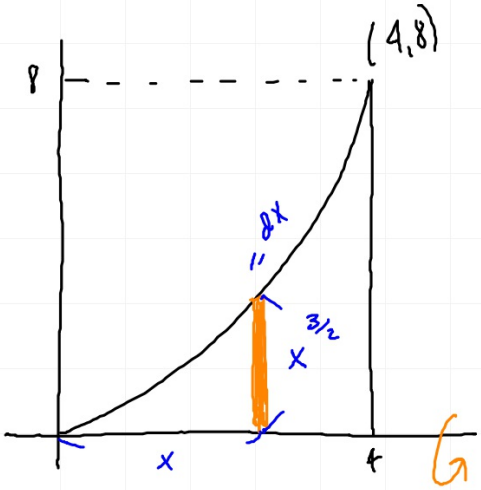
Disk

πr^2 thickness

Δx dy

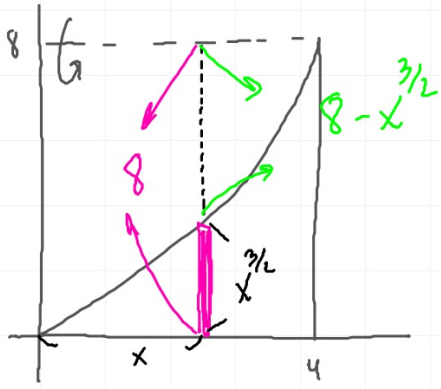
Washer

$\pi(r_o^2 - r_i^2)$ thickness



$y^2 = x^3$

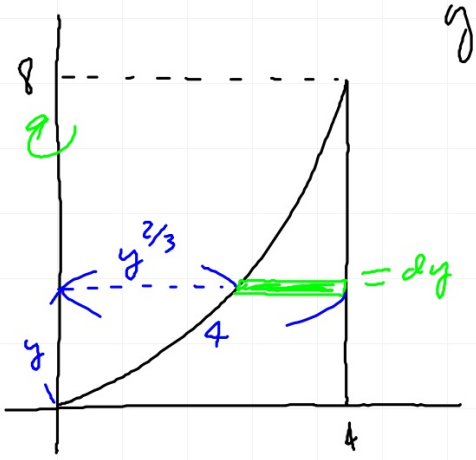
$y = x^{3/2}$



a) $y = 8$

$$V = \pi \int_0^4 \left(x^{3/2}\right)^2 dx$$

$$V = \pi \int_0^4 \left[(8)^2 - \left(8 - x^{3/2}\right)^2 \right] dx$$

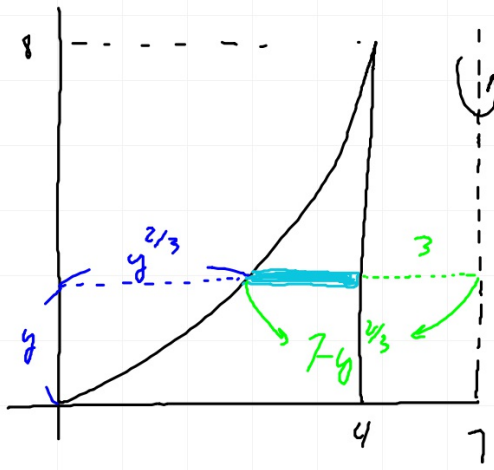


$y^2 = x^3$ ② y-axis

$\downarrow$

$x = y^{2/3}$

$$V = \pi \int_0^8 \left[(4)^2 - (y^{2/3})^2 \right] dy$$



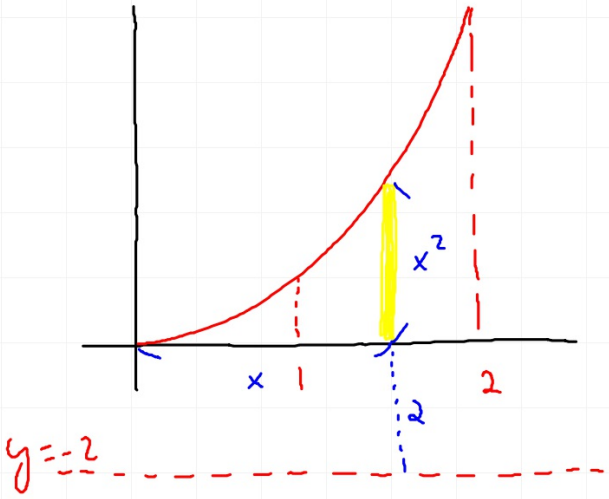
$y^2 = x^3$ e $x = 7$

$\downarrow$

$x = y^{2/3}$

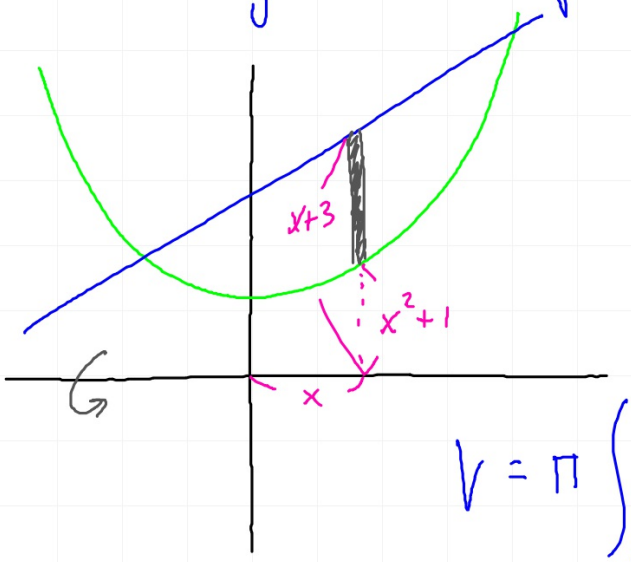
$$V = \pi \int_0^8 \left[(7 - y^{2/3})^2 - (3)^2 \right] dy$$

Bounds: $y = x^2$, x-axis, $x = 1$, $x = 2$ & $y = -2$.



$$V = \pi \int_1^2 \left[\left(x^2 + 2 \right)^2 - \left(2 \right)^2 \right] dx$$

Bounds: $y = x^2+1$ and $y = x+3$ & x axis

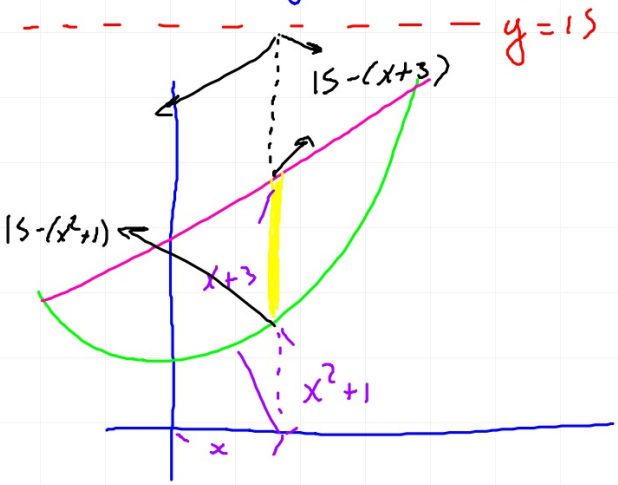


Intersect

$x^2+1 = x+3 \rightarrow x = -1$ or $x = 2$

$$V = \pi \int_{-1}^{2} \left[(x+3)^2 - (x^2+1)^2 \right] dx$$

Bounds: $y = x^2 + 1$ & $y = x + 3$ & $y = 15$.



$$V = \pi \int_{-1}^{2} \left[\left(15 - (x^2+1)\right)^2 - \left(15 - (x+3)\right)^2 \right] dx$$