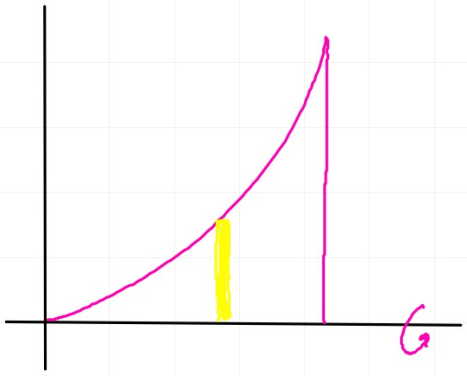
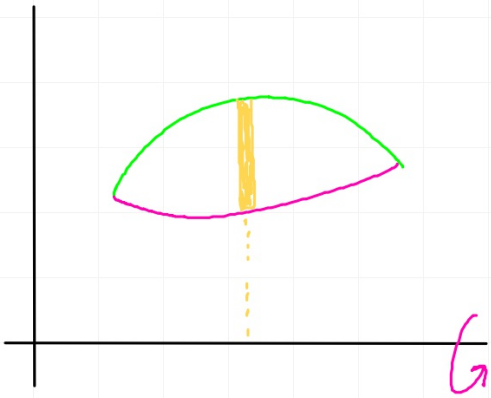
Volumes of Revolution--Disk/Washer Method



Disk

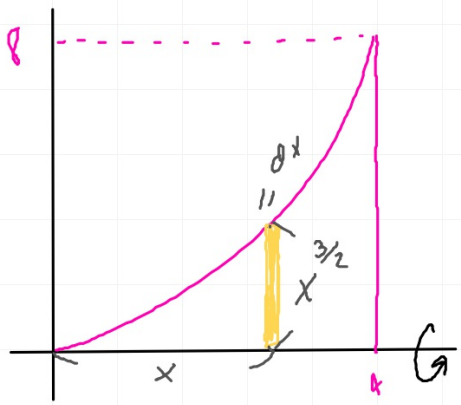
πr^2 thickness

dx dy



Washer

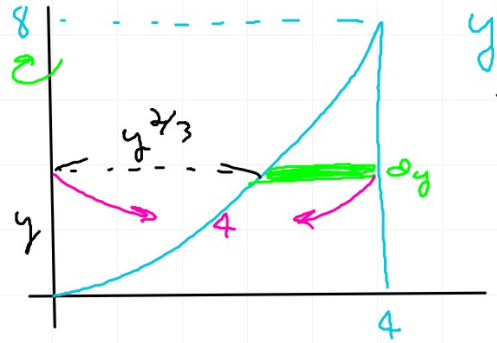
$\pi \left[r_o^2 - r_i^2 \right]$ thickness



$y^2 = x^3$ ↻ x-axis

$y = x^{3/2}$

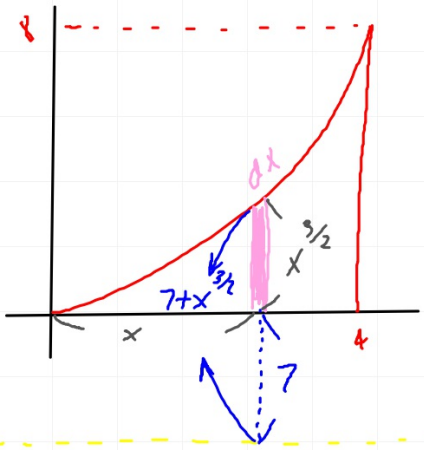
$$V_D = \pi \int_0^4 \left(x^{3/2}\right)^2 dx$$



$y^2 = x^3$ ↻ y-axis

$x = y^{2/3}$

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

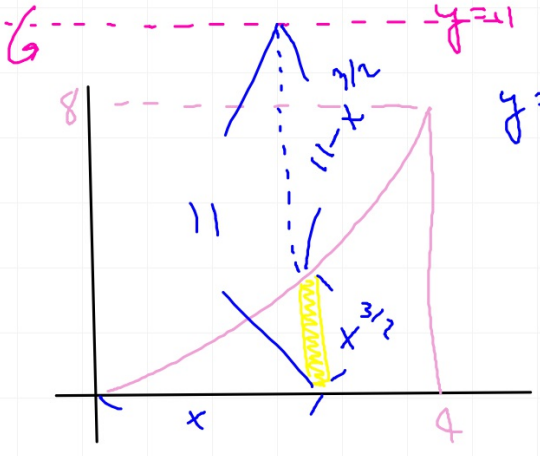


$y^2 = x^3$ e $y = -7$

$\downarrow$

$y = x^{3/2}$

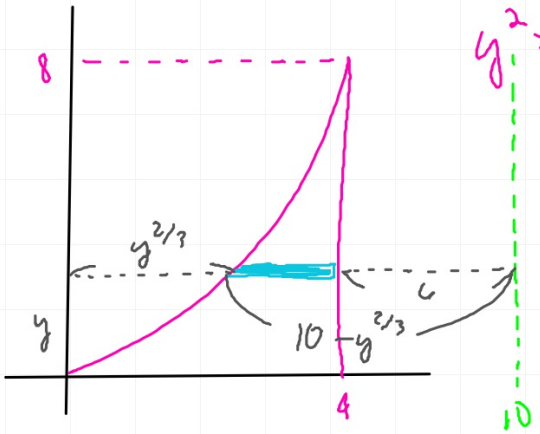
$$V_w = \pi \int_0^4 \left[\left(7 + x^{3/2}\right)^2 - (\ 7\ )^2 \right] dx$$



$y^2 = x^3$ e $y = 11$

$y = x^{3/2}$

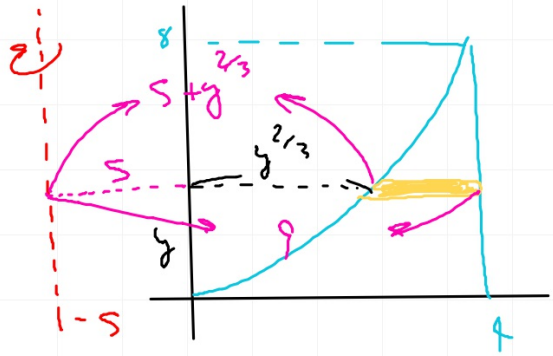
$$V = \pi \int_0^4 \left[(\ 11\ )^2 - \left(11 - x^{3/2}\right)^2 \right] dx$$



$y^2 = x^3$ e $x = 10$

$x = y^{2/3}$

$$V_w = \pi \int_0^8 \left[\left(10 - y^{2/3}\right)^2 - \left(6\right)^2 \right] dy$$

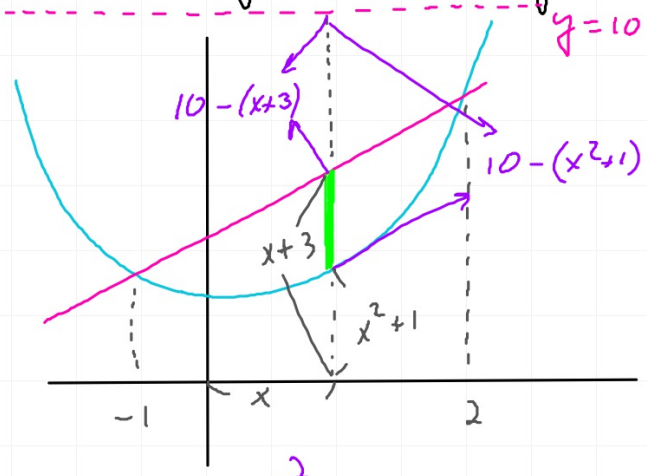


$y^2 = x^3$ e $x = -5$

$x = y^{2/3}$

$$V_w = \pi \int_0^8 \left[(9)^2 - \left(5 + y^{2/3}\right)^2 \right] dy$$

Bounds: $y = x^2 + 1$ and $y = x + 3$ & $y = 10$



$$V = \pi \int_{-1}^{2} \left[\left(10 - (x^2+1)\right)^2 - \left(10 - (x+3)\right)^2 \right] dx$$