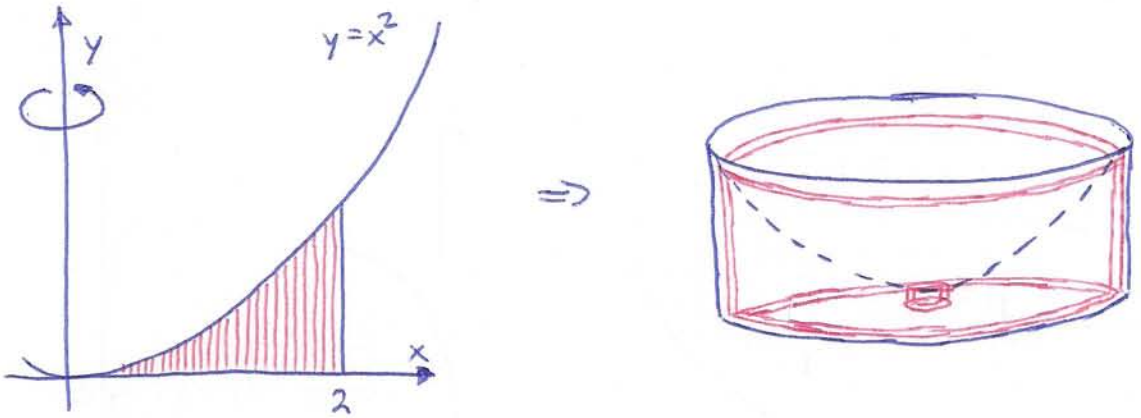
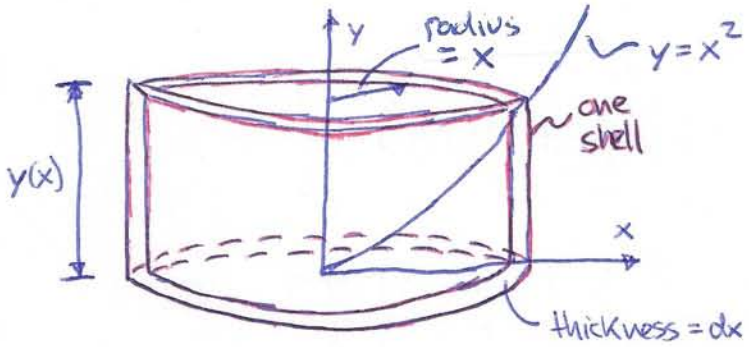
Volume Calculations



Method of Shells (cylinders)



Volume of shell

$= 2\pi r\, h\, dx$

$= 2\pi (x)(y(x))\, dx$

$= 2\pi (x)(x^2)\, dx$

$$\text{Total Volume} = \int_0^2 2\pi (x)(x^2)\, dx = \int_0^2 2\pi x^3\, dx$$

$$= \left[\frac{2\pi}{4} x^4\right]_0^2 = \left[\frac{2\pi}{4}(2)^4\right] - \left[\frac{2\pi}{4}(0)^4\right]$$

$$= \frac{2\pi}{4}(16) = 8\pi$$