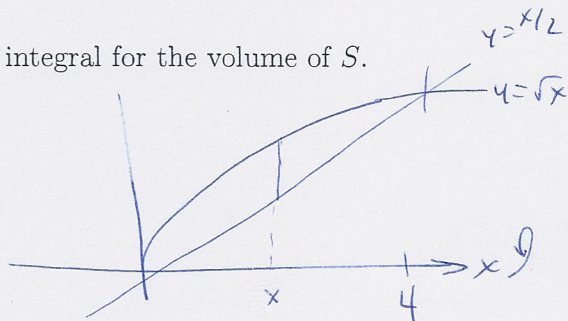


1. (10 points) The curves $y = \sqrt{x}$ and $y = \frac{x}{2}$ enclose a region. Let S be the solid formed by revolving this region about the x -axis.

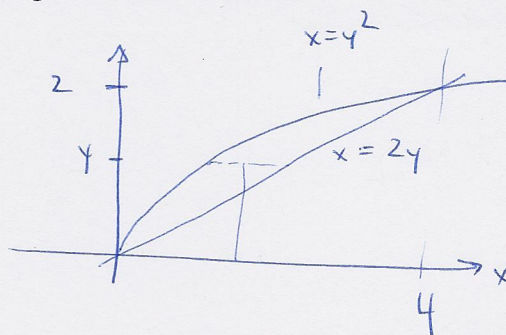
- (a) Use the method of disks to write a definite integral for the volume of S .
Do not evaluate this integral.

$$\begin{aligned} V &= \int_0^4 \pi (\sqrt{x})^2 - \pi \left(\frac{x}{2}\right)^2 dx \\ &= \int_0^4 \pi x - \pi \frac{x^2}{4} dx \\ &= \pi \int_0^4 x - \frac{x^2}{4} dx \end{aligned}$$



- (b) Use the method of shells to write a definite integral for the volume of S .
Do not evaluate this integral.

$$\begin{aligned} V &= \int_0^2 2\pi y (2y - y^2) dy \\ &= 2\pi \int_0^2 y^2 - y^3 dy \end{aligned}$$



- (c) If asked to evaluate one of these integrals, which one would you prefer to evaluate? Why?