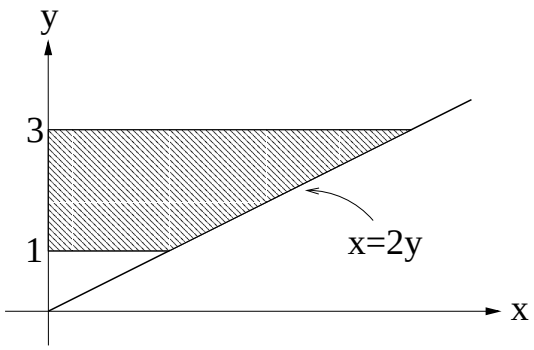
Question

Sketch the region enclosed by the given curves and find the volume of the solid generated when it is revolved about the x-axis:

$x = 2y$, $y = 1$, $y = 3$, $x = 0$.

Answer



Best to use shell method:

$$\int_{y=1}^{y=3} (2\pi y)(2y)\,dy = 4\pi \int_{y=1}^{y=3} y^2\,dy = 4\pi \left[\frac{y^3}{3}\right]_1^3 = 4\pi\left(9 - \frac{1}{3}\right) = \frac{104\pi}{3}$$