

A cross-section is a washer with inner radius  $\frac{3}{5}x^2$  and outer radius  $\frac{8}{5} - x^2$ , so its area is

$$A(x) = \pi\left(\frac{8}{5} - x^2\right)^2 - \pi\left(\frac{3}{5}x^2\right)^2$$

$$= \pi\left(\frac{64}{25} - \frac{16}{5}x^2 + x^4 - \frac{9}{25}x^4\right) .$$

$$V = \int_{-1}^1 A(x) dx = \int_{-1}^1 \pi\left(\frac{64}{25} - \frac{16}{5}x^2 + \frac{16}{25}x^4\right) dx$$

$$= 2\pi \int_0^1 \left(\frac{64}{25} - \frac{16}{5}x^2 + \frac{16}{25}x^4\right) dx$$

$$= 2\pi \left[\frac{64}{25}x - \frac{16}{15}x^3 + \frac{16}{125}x^5\right]_0^1 = 2\pi\left(\frac{64}{25} - \frac{16}{15} + \frac{16}{125}\right) = \frac{1216}{375}\pi$$



