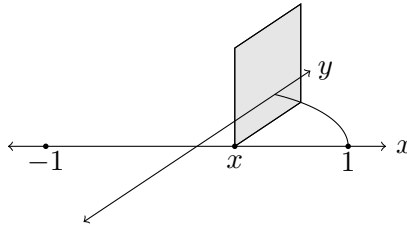


VOLUME WITH QUARTER UNIT CIRCLE BASE AND SQUARE SLICES

The quarter circle on the base is given by the equation $y = \sqrt{1 - x^2}$ with $0 \leq x \leq 1$. The square made by the x -slice has area $s(x)^2$, where $s(x)$ is the length of the segment along the quarter circle x -slice.



Since $y = \sqrt{1 - x^2}$ along the circle, $s(x) = \sqrt{1 - x^2}$. Therefore the area of the x -slice is

$$A(x) = s(x)^2 = 1 - x^2,$$

so the volume of the solid is

$$\int_0^1 A(x) dx = \int_0^1 s(x)^2 dx = \int_0^1 (1 - x^2) dx,$$

which is a polynomial integral whose value you can check is $\frac{2}{3}$.