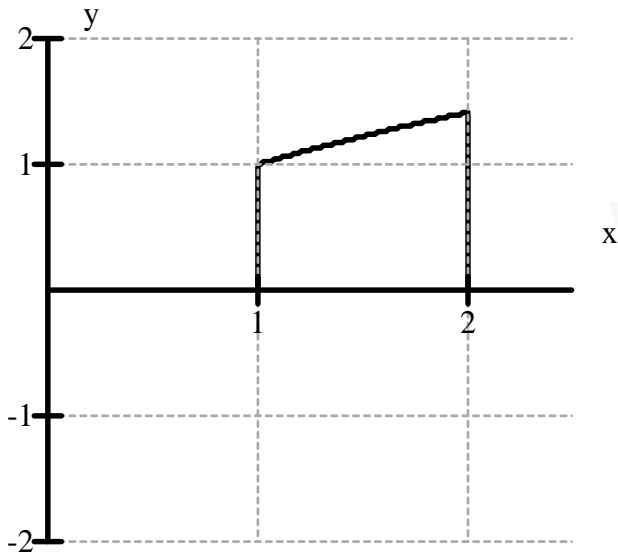
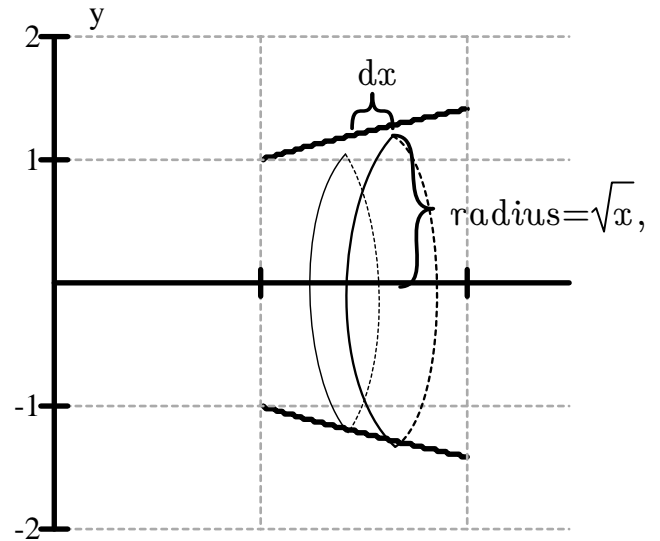


Find the volume of the region obtained between the curve  $y=\sqrt{x}$ , the x axis,  $x=1$  and  $x=2$ .

1) First sketch the curve  $y=\sqrt{x}$  between  $x=1$  and  $x=2$ .



2) Draw a disk. The height of this disk is  $dx$ , roughly, and radius is, roughly,  $\sqrt{x}$ .



3) Now we can use the disk method of integration to find the volume.

$$\begin{aligned} \text{Volume} &= \int_1^2 \pi(\sqrt{x})^2 dx \\ &= \pi \int_1^2 \sqrt{x}^2 dx \end{aligned}$$

Apply the definition of the disk method

$$\begin{aligned} &= \pi \int_1^2 x dx \\ &= \pi \left[ \frac{1}{2} x^2 \right]_1^2 \end{aligned}$$

Factor  $\pi$  out

$$\sqrt{x}^2 = \left( \frac{1}{x^2} \right)^2 = x^{\frac{2}{2}} = x^1 = x$$

Apply the power rule for integrals

$$= \pi \cdot \frac{1}{2} (2^2 - 1^2)$$

Setup the evaluation between the limits

$$= \pi \cdot \frac{1}{2} (4 - 1)$$

Simplify within parenthesis

$$= \frac{3\pi}{2}$$

Rewrite to make it look more clean