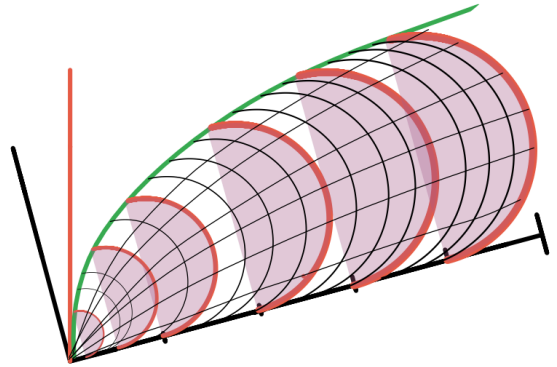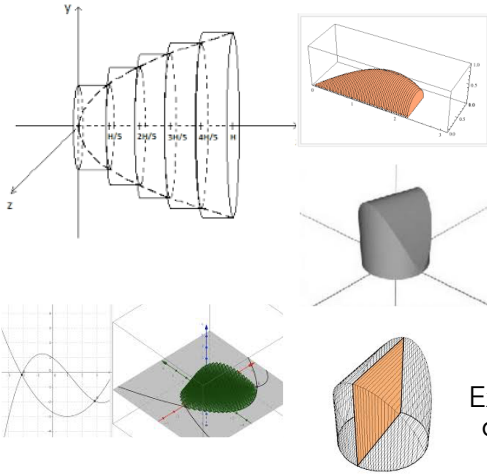# Volume of Solids
With Known Cross Sections

Ex: Find the volume of a solid with semicircular cross sections bounded by the x axis and the graph of y=√x, from x = 0 to x = 9

The volume of solids with known cross sections can be found by taking the integral of the cross sections in the bounded region. To do so, you must take the integral of the equation for the area of the shape, but instead of the radius or base, you replace that variable with the function on the graph.

$$A = \tfrac{1}{2}\pi r^2$$

$$V = \int_0^9 \tfrac{1}{2}\pi r^2 \, dx = \tfrac{\pi}{2} \int_0^9 \left(\tfrac{\sqrt{x}}{2}\right)^2 dx$$

$$= \tfrac{\pi}{2} \int_0^9 \tfrac{x}{2} \, dx = 31.809$$