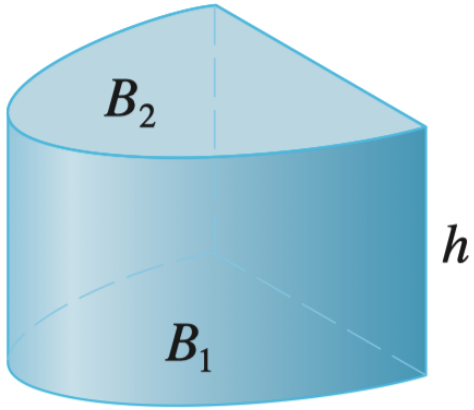
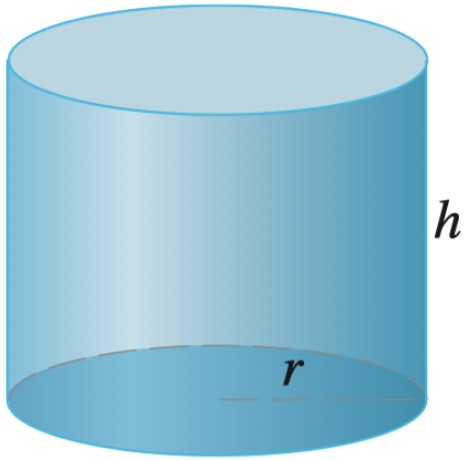
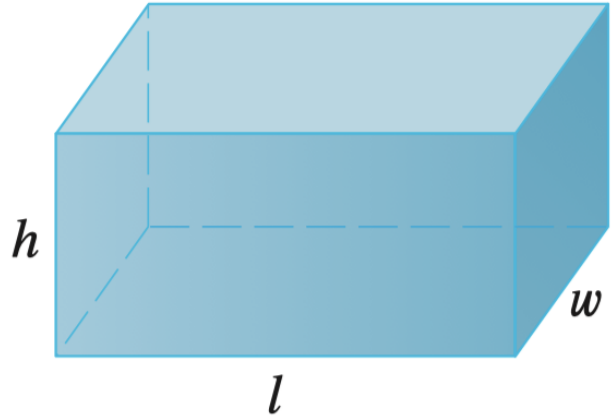
How can slicing help us find volumes of solids?

Quick Check

What general idea could be used to find the volume of each of the following solids?

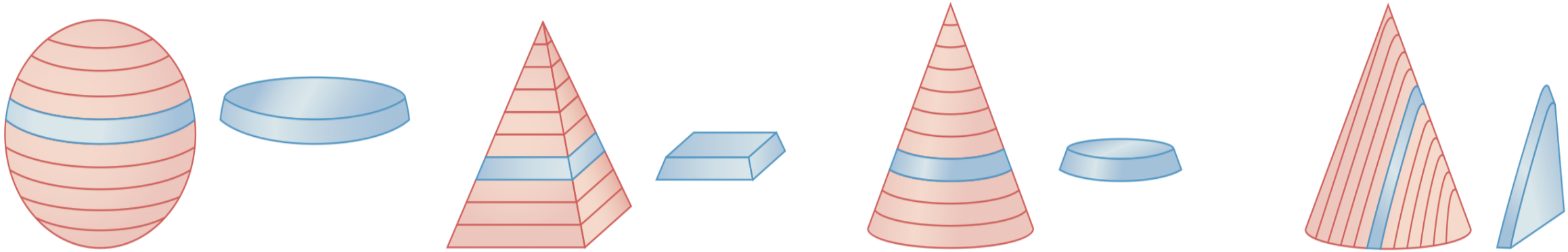






Solids with similar slices

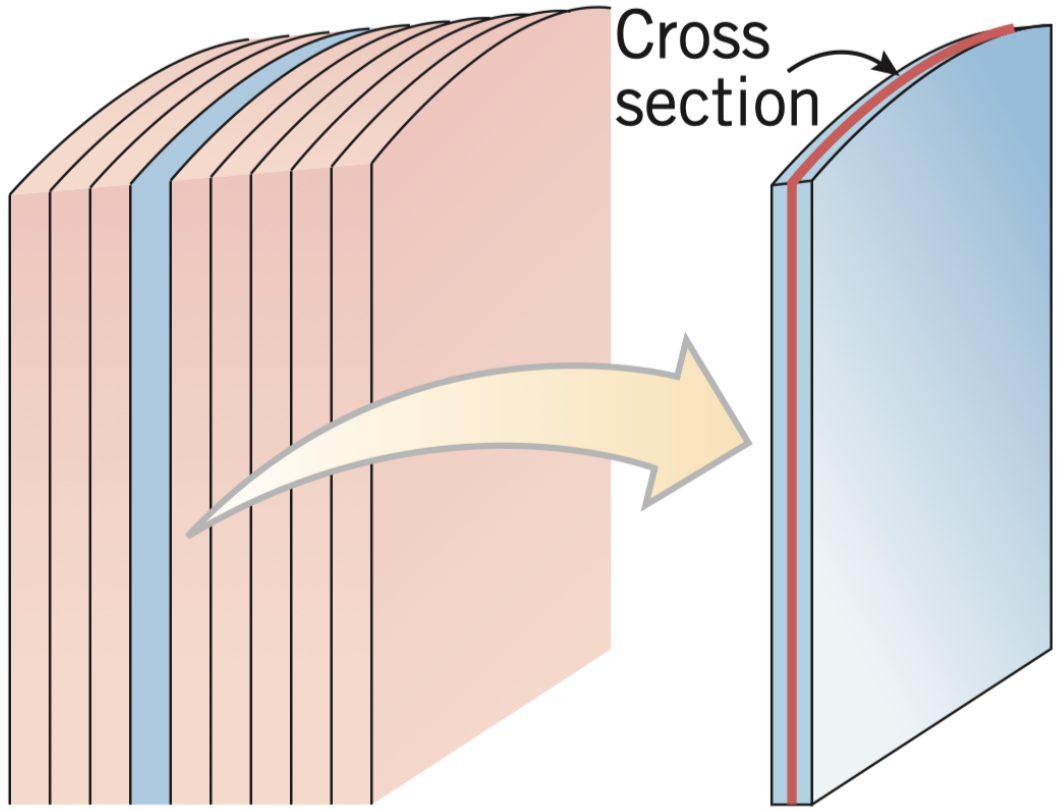
What general idea could be used to find the volume of each of the following solids?



Volume by Crossections

The volume of a solid can be obtained by integrating the cross-sectional area from one end of the solid to the other.

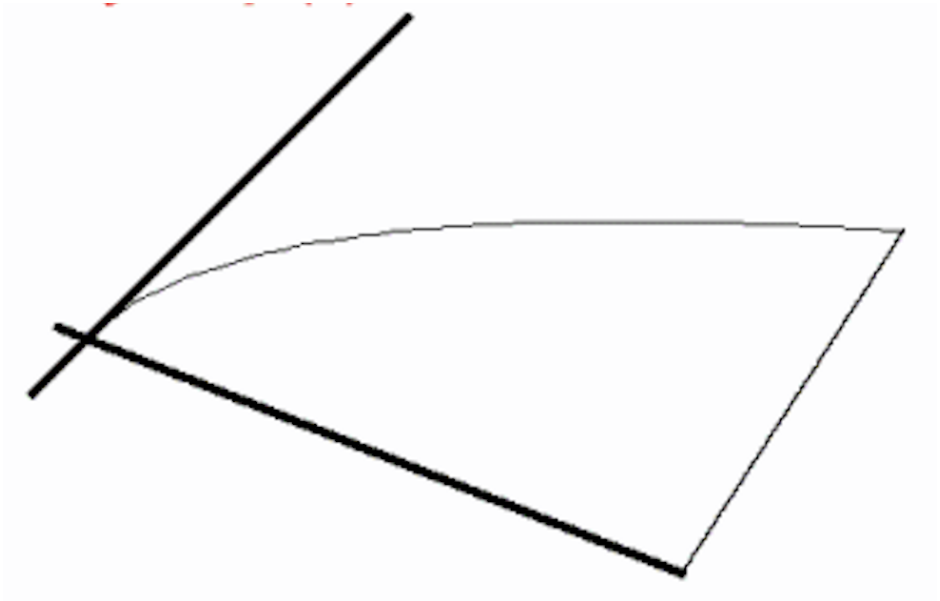
$$\int_{\text{start of solid}}^{\text{end of solid}} \text{cross-sectional Area}$$

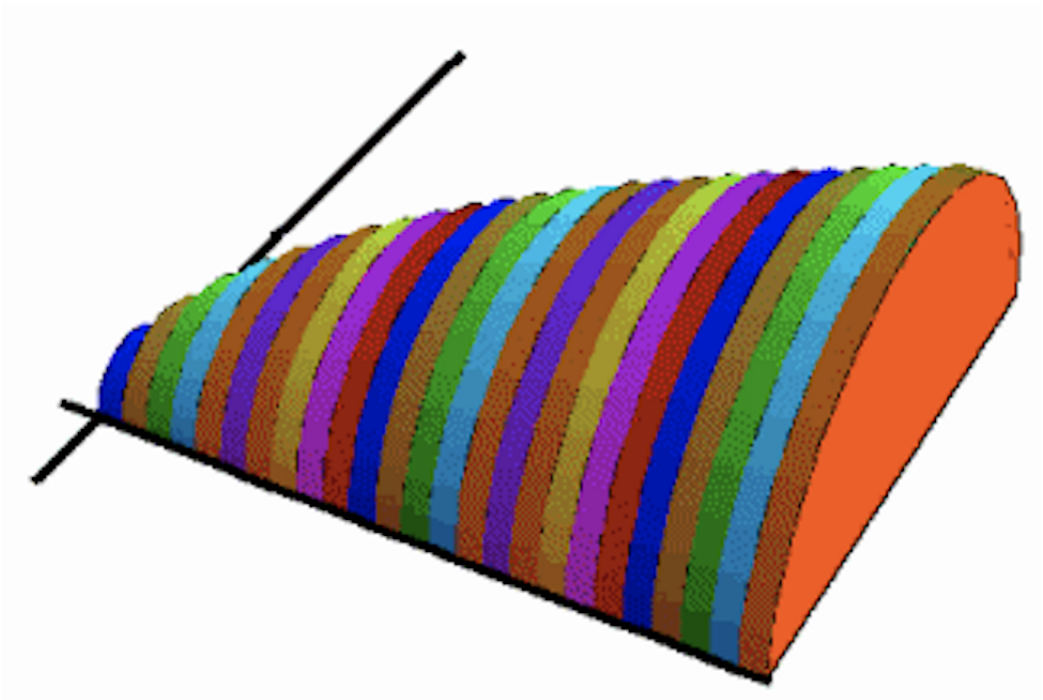


Recall that the integral does the job of adding.

Find the Volume.

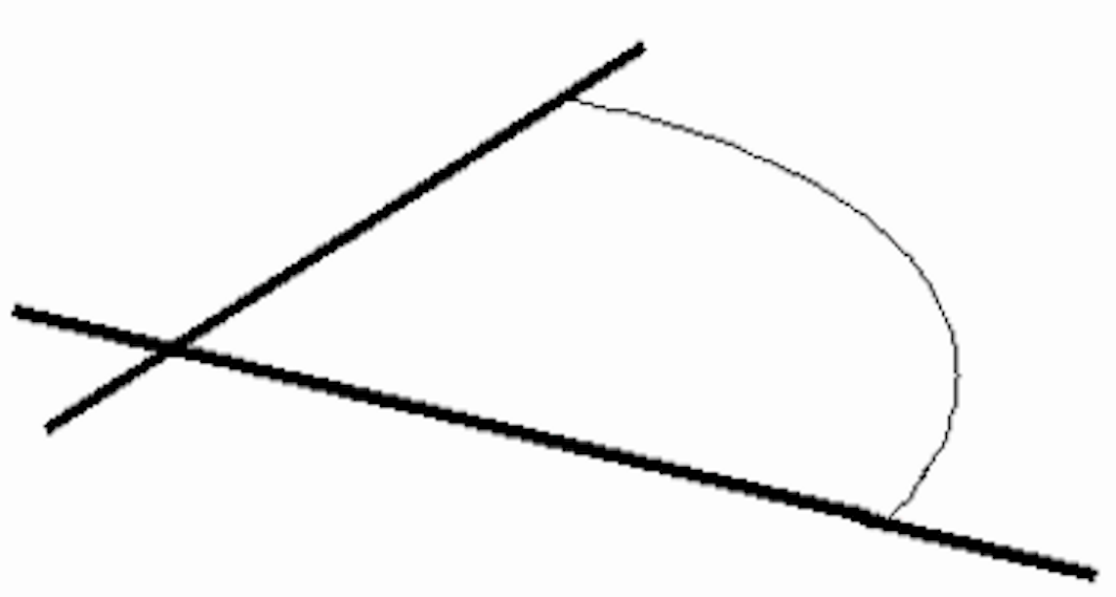
The semicircular crossections of a solid whose base is in the $xy-$plane between the $x-$axis and the curve $y = \sqrt{x}$ over the interval $[0, 9]$.

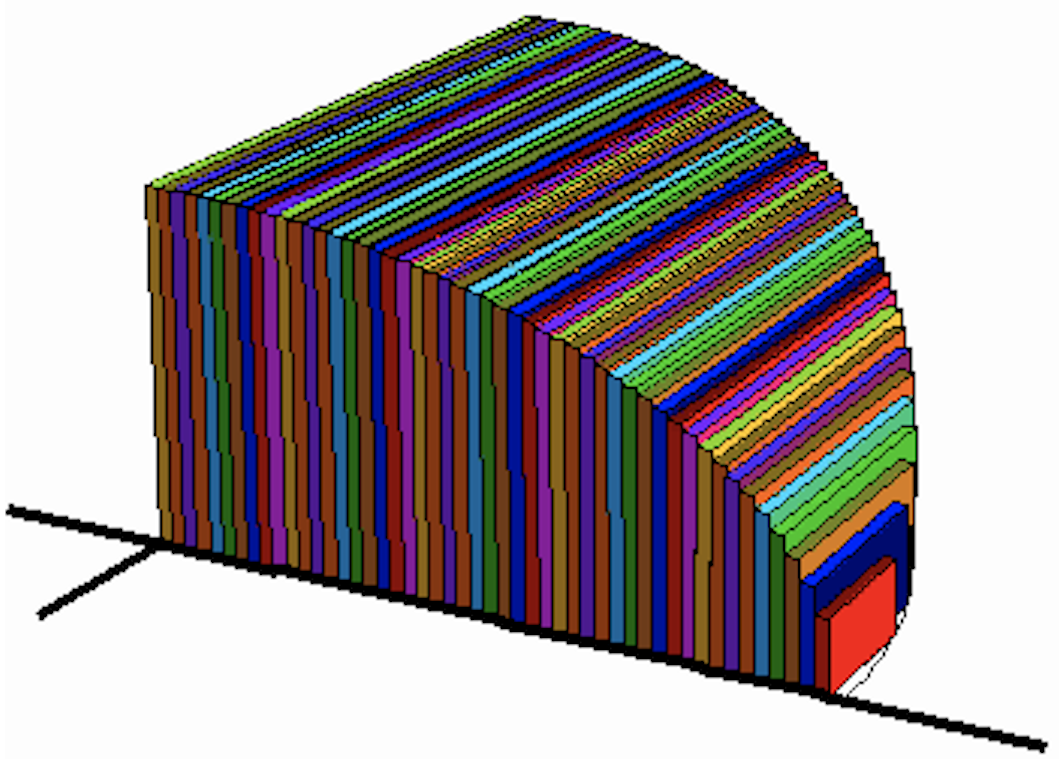




Find the Volume.

The square crossections of a solid whose base is a quarter of a circle of radius 1.

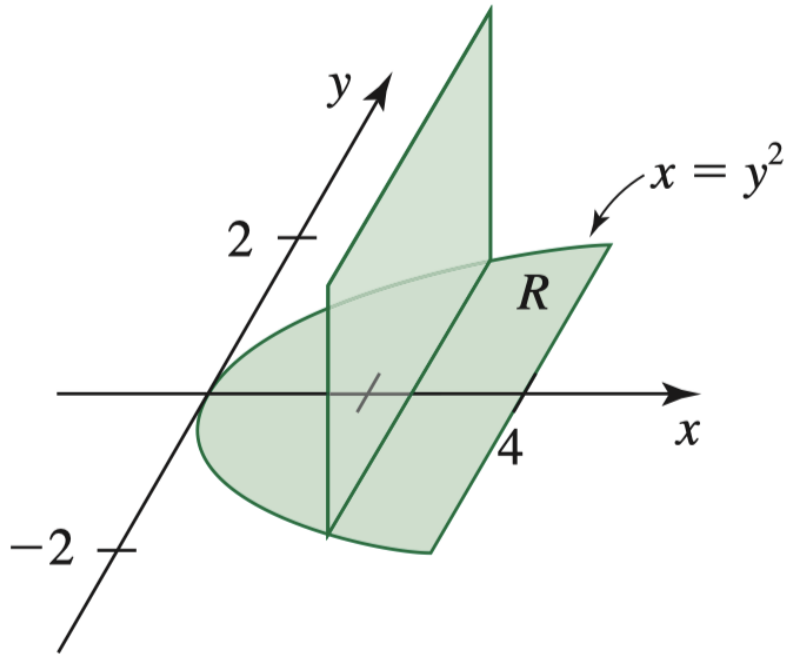




Practice

Find the volume of the solid with the given base and the indicated shape of every cross-section taken perpendicular to the $x-$axis.

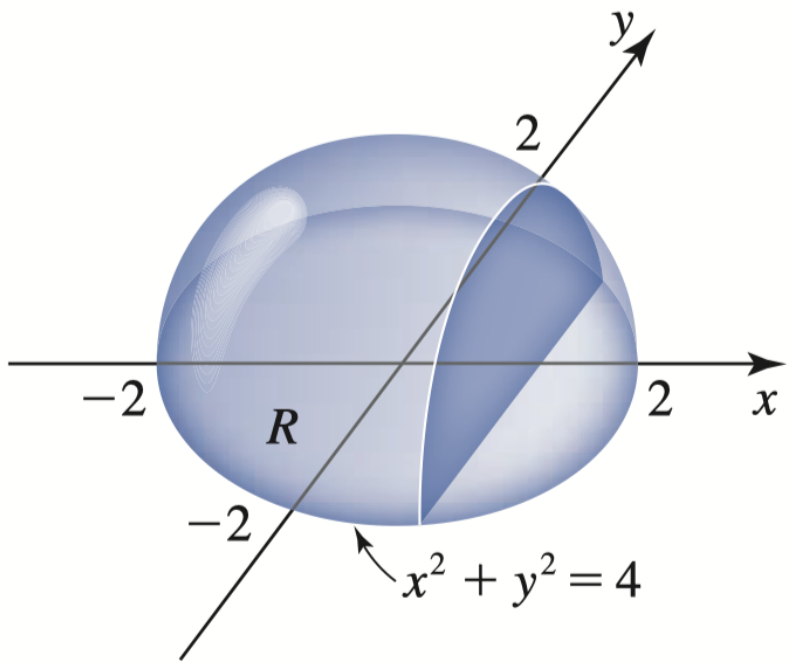
Cross section: a square



Practice

Find the volume of the solid with the given base and the indicated shape of every cross-section taken perpendicular to the $x-$axis.

Cross section: a semicircle



Cross section: a quarter circle