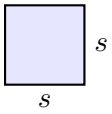
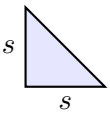
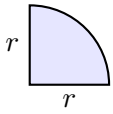
Reference: Cross-Section Area Formulas

Overview

For a solid defined by cross-sections perpendicular to an axis, the volume is the integral of the Area function $A(x)$.

$$V = \int_a^b A(x)\,dx$$

In the table below, s represents the length of the slice (base) sitting on the region in the xy-plane.

Shape	Diagram	Area Formula
1. Square Side length s		$A = s^2$
2. Rectangle Base b, Height h		$A = b \cdot h$ *Note: h is often constant or a function of x.*
3. Isosceles Right Triangle Leg length s		$A = \frac{1}{2}s^2$
4. Equilateral Triangle Side length s		$A = \frac{\sqrt{3}}{4}s^2$
5. Circular (Disk) Radius r		$A = \pi r^2$ **Watch out:** If the base on the graph is diameter s, then $r = s/2$.
6. Semicircle Radius r		$A = \frac{1}{2}\pi r^2$ **Watch out:** Usually the base s is the diameter, so $r = s/2$.
7. Quarter Circle Radius r		$A = \frac{1}{4}\pi r^2$ **Note:** Here, the base s is typically the radius itself, so $r = s$.