

8.2 Area of a Surface of Revolution

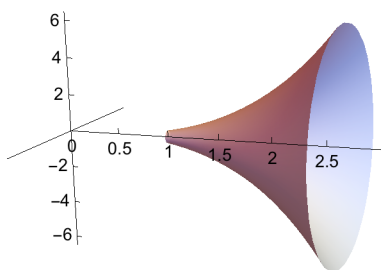
Example 1 Find the surface area of an open-ended cylinder with radius 4 and length 12.

To find the surface area of revolution of a function $f(x)$, we can slice and approximate, and assume each small slice of Δx is a cylinder with length equal to the arc-length of the strip, and the radius is $f(x)$; and integrate.

Surface Area of Revolution

$$SA = 2\pi \int_a^b f(x) \sqrt{1 + \left(\frac{dy}{dx}\right)^2} dx$$

Example 2 Find the surface area revolution for the curve $y = \frac{x^3}{3}$ on the interval $[1, \sqrt{7}]$ rotated about the x -axis.



Example 3 Find the surface area of Torricelli's trumpet from section 7.8.

Example 4

Find the surface area when the curve $y = 1 - x^2$ for $0 \leq x \leq 1$ is rotated about the y axis.

Example 5

Use Simpson's rule with $n = 10$ to find the surface area when $y = x + \sqrt{x}$ for $1 \leq x \leq 2$ is revolved about the x -axis.