Volume Obtained By Revolving the curve $y = x^2$ about the X Axis

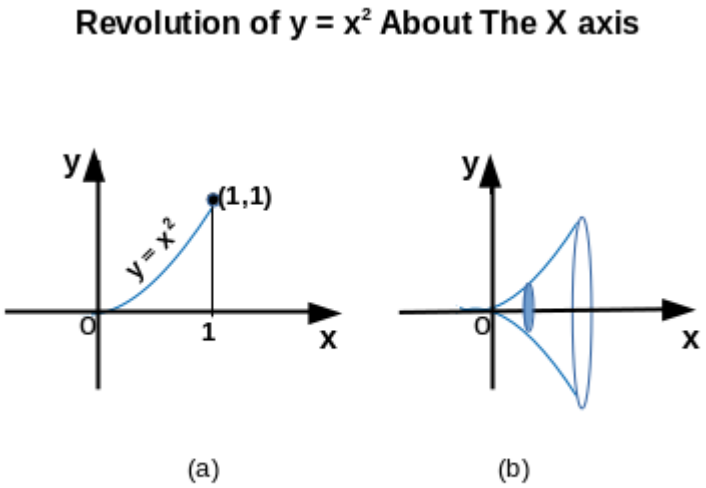

Figure 113.7

The curve $\mathbf{y = x^2}$ in figure 113.7 (a) is revolved about the x axis within the limits x = 0 and x = 1. The funnel shape in figure 113.7 (b) is the result of the revolution. We are interested in its volume.

Derivation Of Volume Of Revolution

Area of circular cross-section (solid blue in (b)) = $\boldsymbol{\pi(x^2)^2}$. Since radius of cross-section is x^2
Volume of cross-sectional area = $\boldsymbol{\pi(x^2)^2\,dx}$

So, volume of revolution = $\int_0^1 \boldsymbol{\pi(x^2)^2\,dx}$----------**(1)**

$$= \pi\int_0^1 \mathbf{x^4\,dx}$$

$$= \boldsymbol{\pi/5.}$$

The string is $S_1P_1A_{14}$ - Empty Space – Containership - Volume