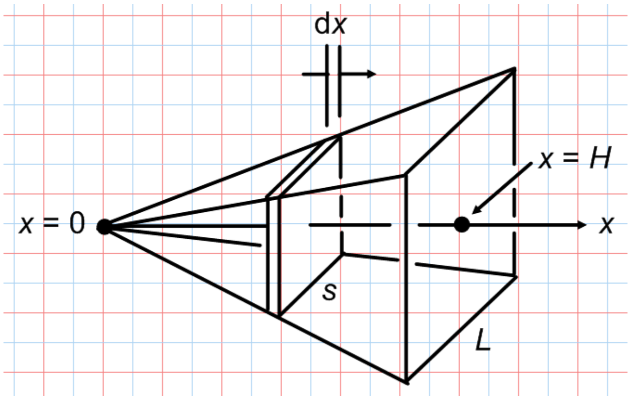
Square-Based Pyramid:

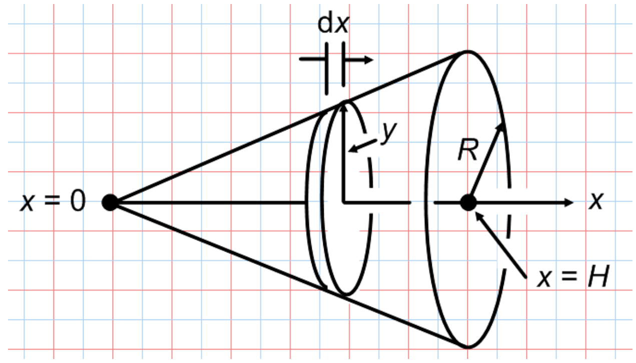


The differential of volume $\mathrm{d}V$ is the right, square prism shown in the figure. So,

$\mathrm{d}V = \text{base area} \cdot \text{height} = s^2 \cdot \mathrm{d}x$.

1) Find the linear relation $s = s(x)$ to express the differential $\mathrm{d}x$ in terms of $\mathrm{d}s$, and then set up the integral $V = \int \mathrm{d}V$ in terms of $\mathrm{d}s$. Finally, find the formula for V by integrating from $s = 0$ to $s = L$.

Cone:



The differential of volume $\mathrm{d}V$ is the cylinder shown in the figure. So,

$$\mathrm{d}V = \text{base area} \cdot \text{height} = \pi y^2 \cdot \mathrm{d}x \text{ .}$$

2) Find the linear relation $y = y(x)$ to express the differential $\mathrm{d}x$ in terms of $\mathrm{d}y$, and then set up the integral $V = \int \mathrm{d}V$ in terms of $\mathrm{d}y$. Finally, find the formula for V by integrating from $y = 0$ to $y = R$.