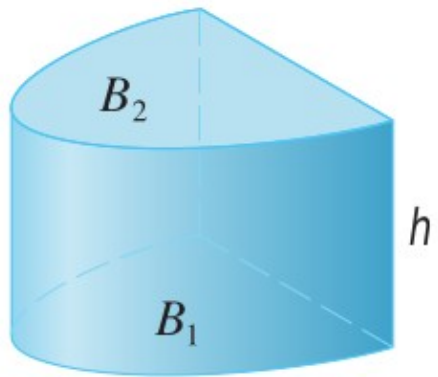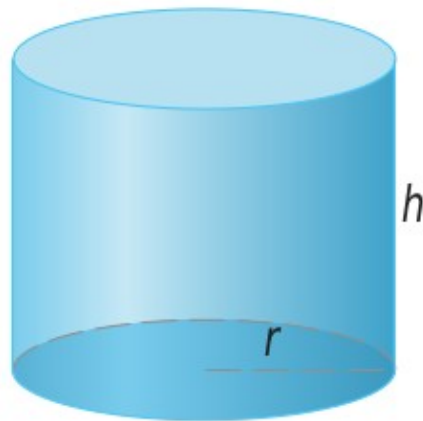# Aplicações de integrais: cálculo de volumes
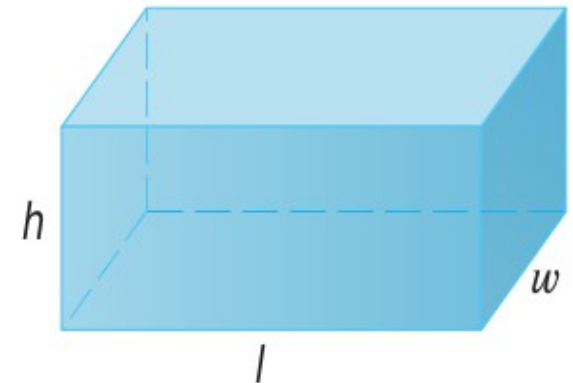
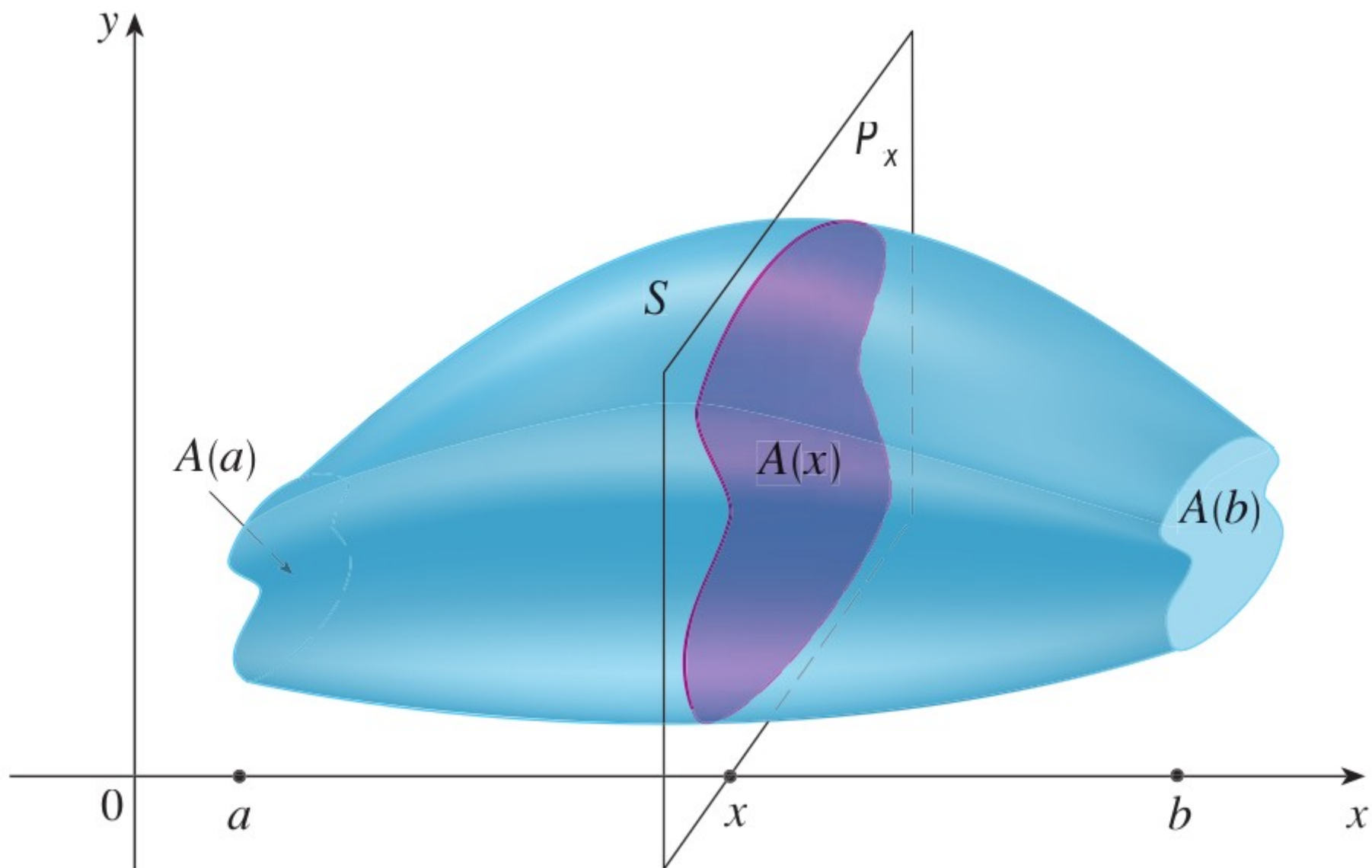## Prof. Adriano Barbosa

Volume

(a) Cylinder $V = Ah$ (b) Circular cylinder $V = \pi r^2 h$ (c) Rectangular box $V = lwh$
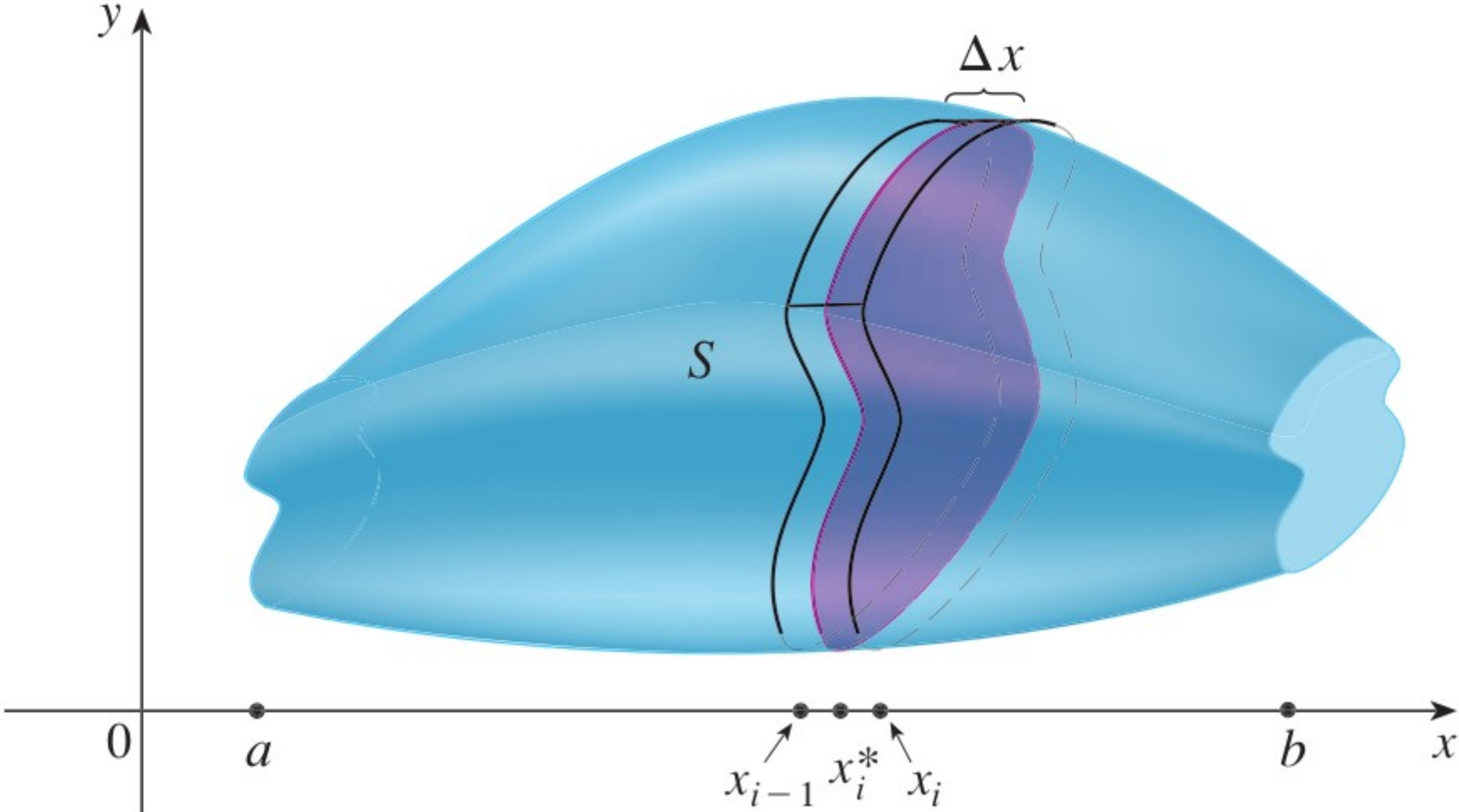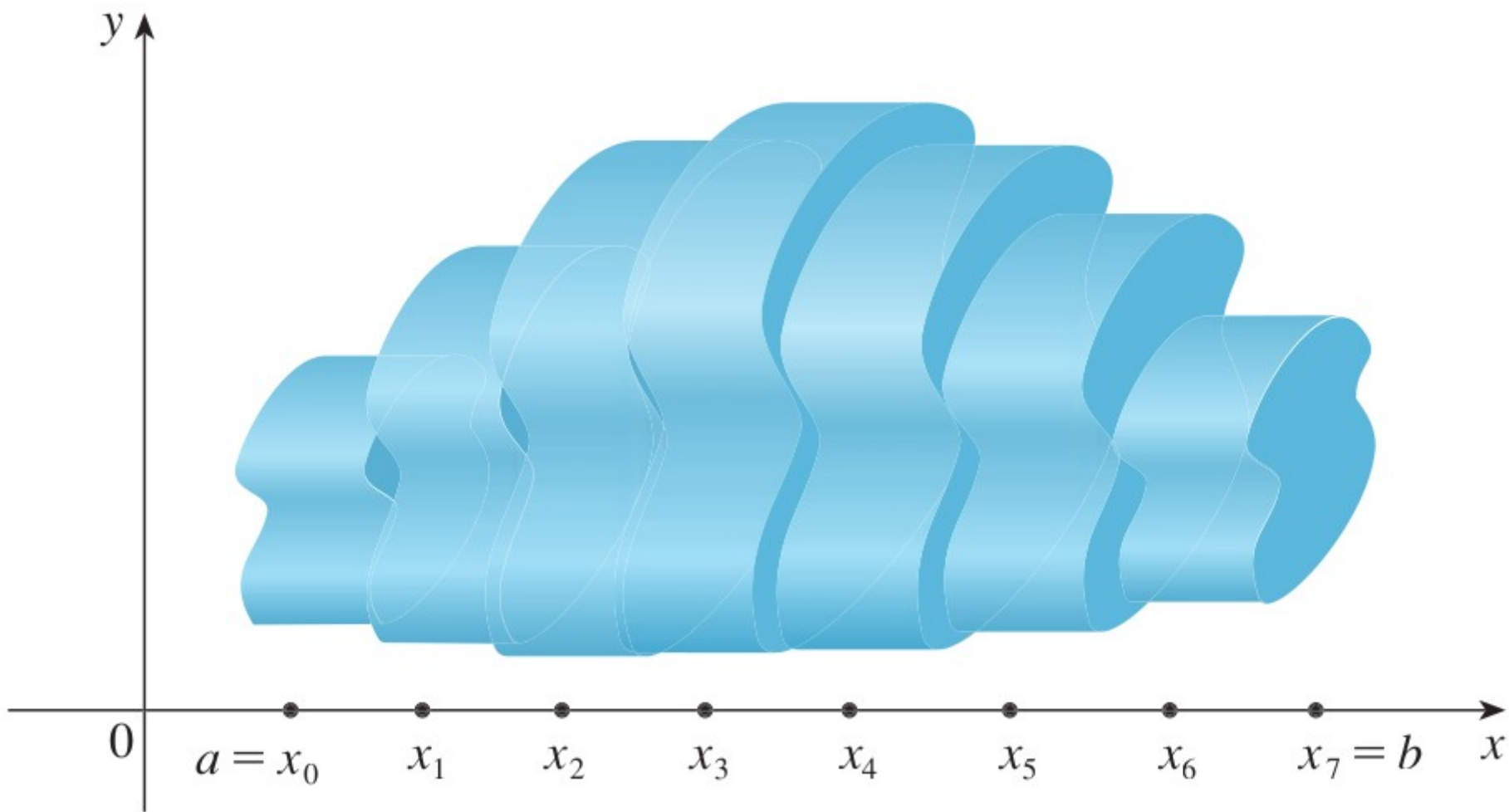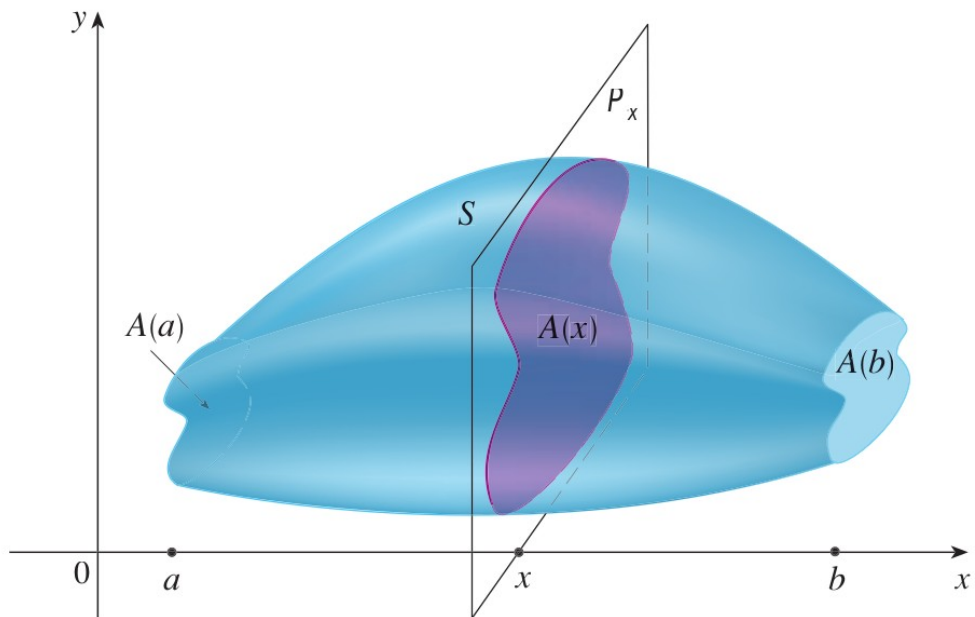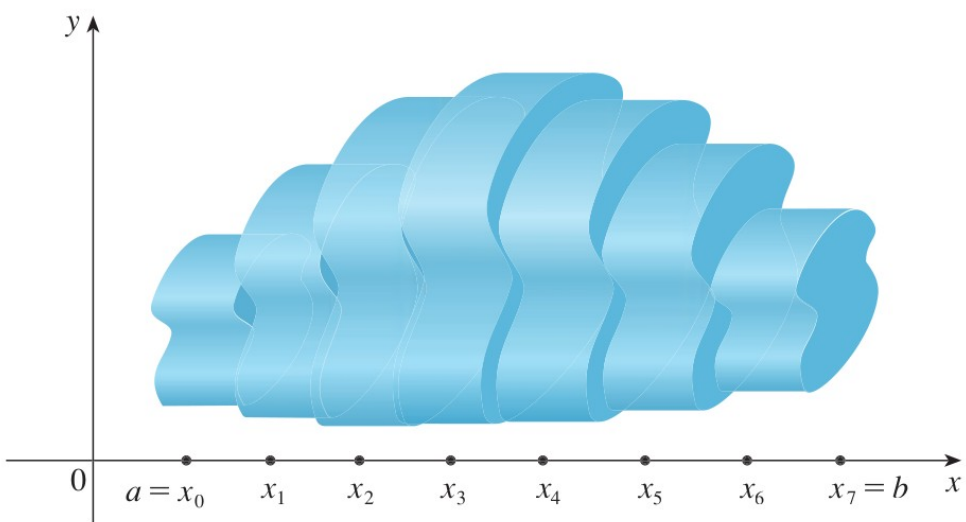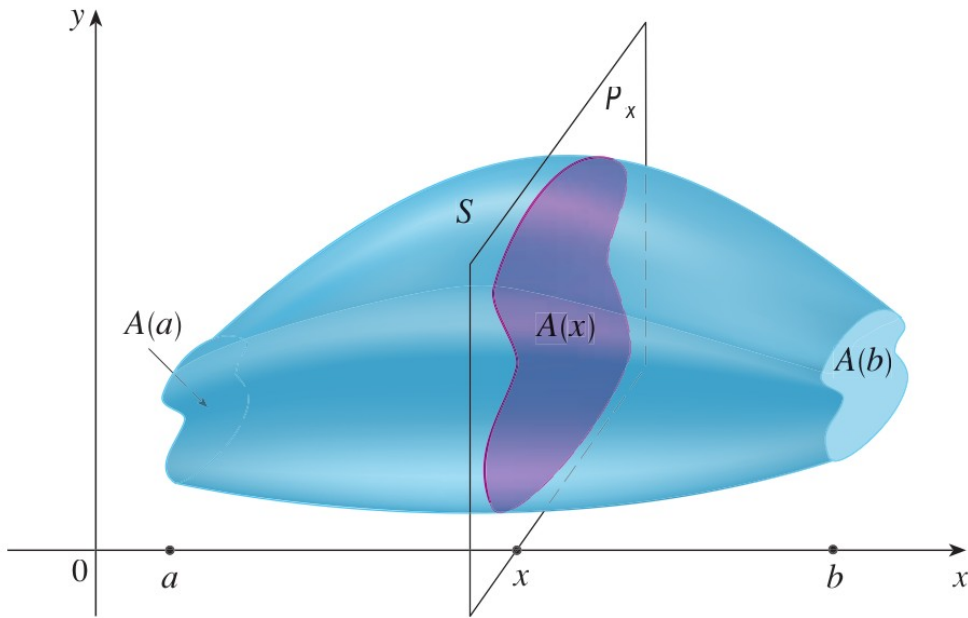
Volume

Volume

Volume

Volume

$$V(S_i) \approx A(x_i^*) \, \Delta x$$

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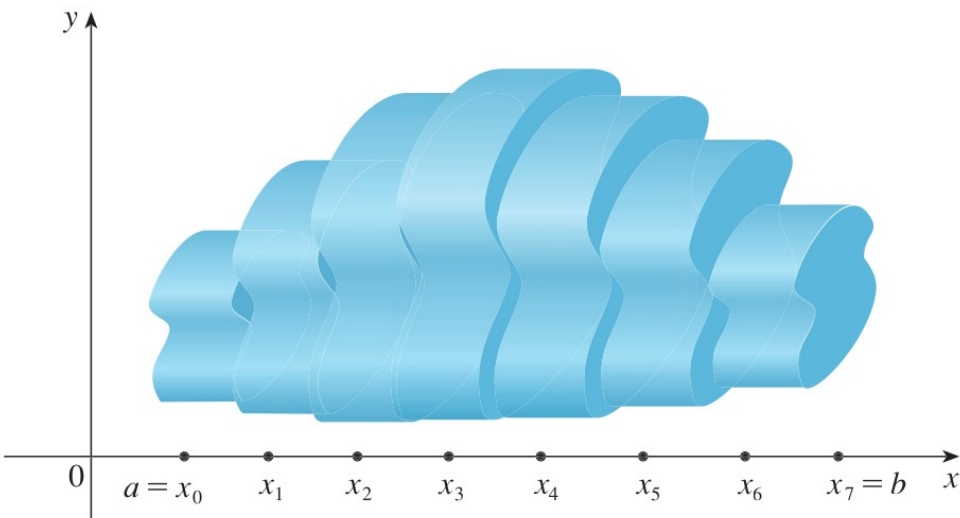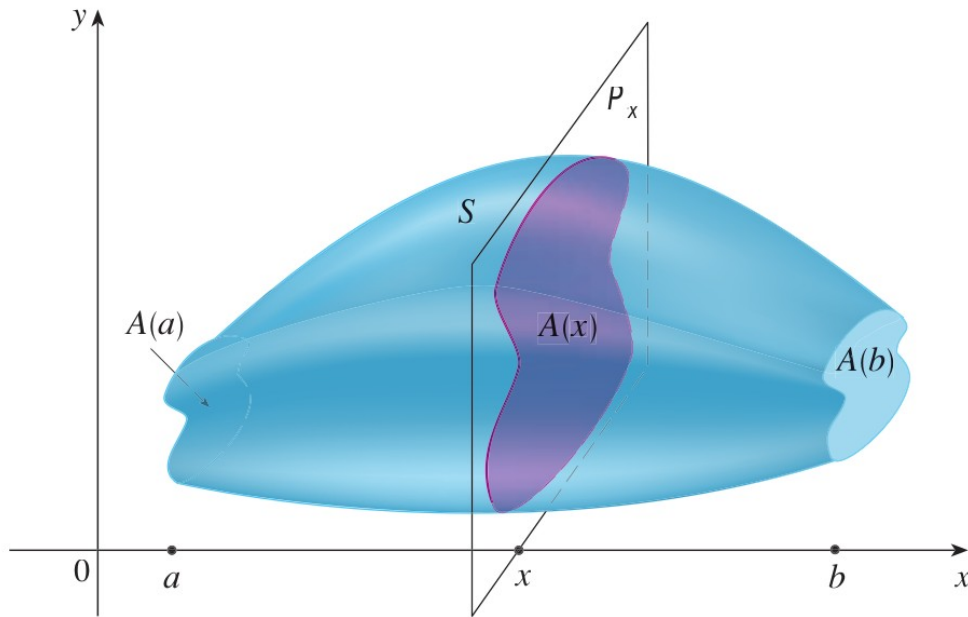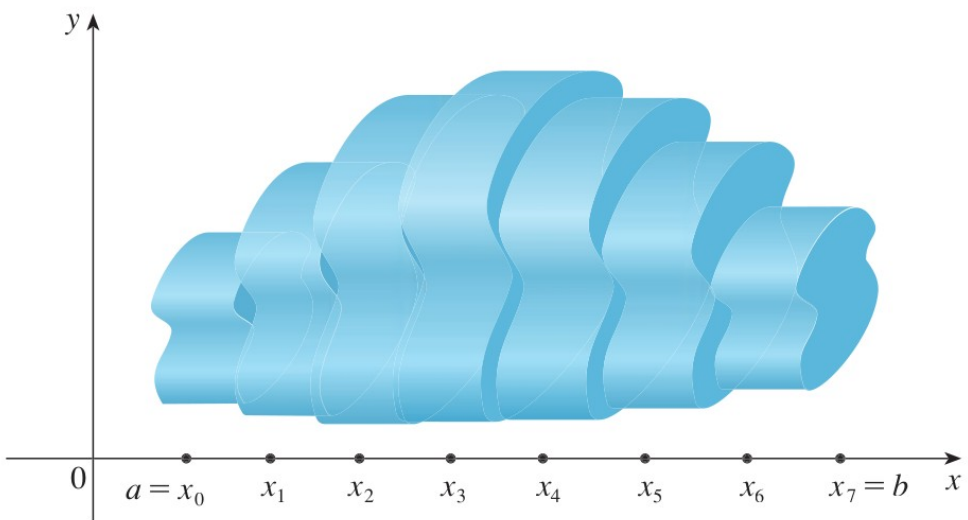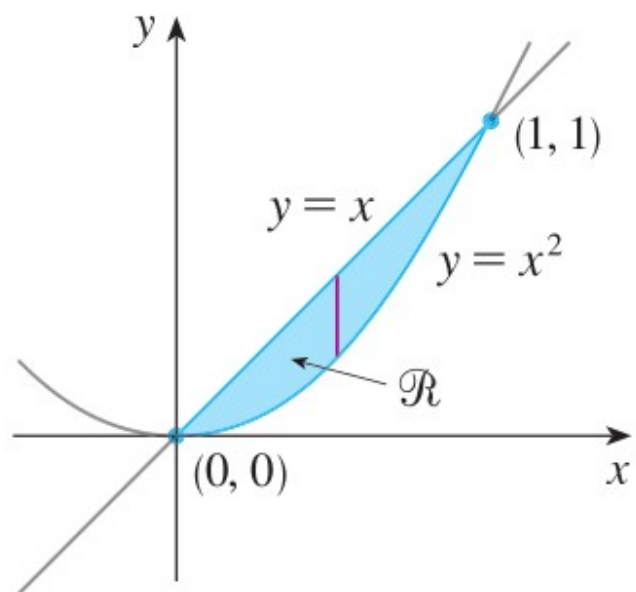$$V \approx \sum_{i=1}^{n} A(x_i^*) \, \Delta x$$

Volume

$$V(S_i) \approx A(x_i^*)\, \Delta x$$

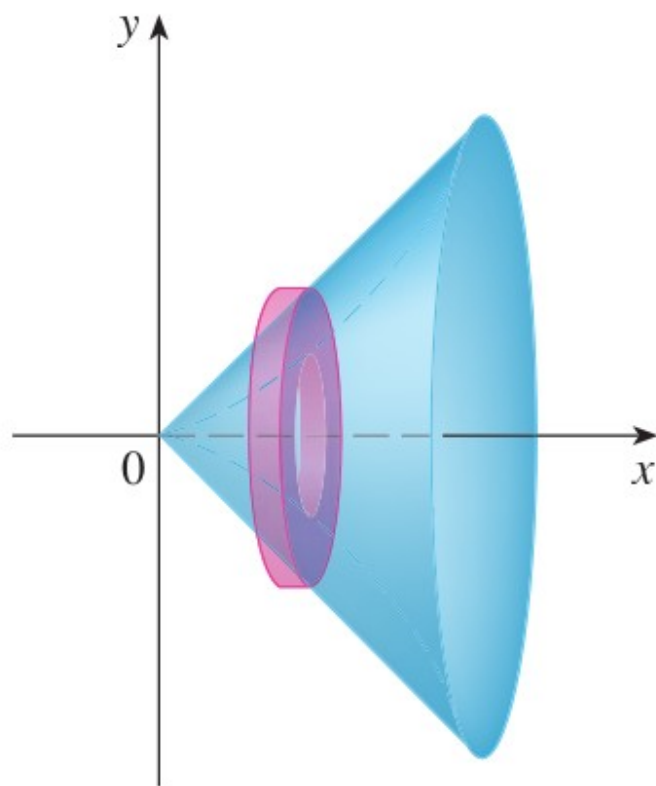$$V \approx \sum_{i=1}^{n} A(x_i^*)\, \Delta x$$

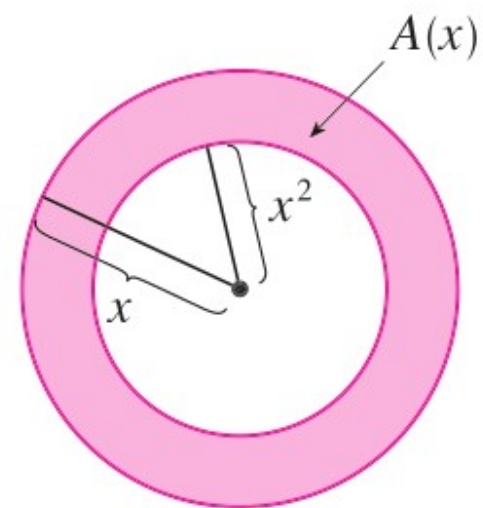$$V = \lim_{n \to \infty} \sum_{i=1}^{n} A(x_i^*)\, \Delta x = \int_a^b A(x)\, dx$$
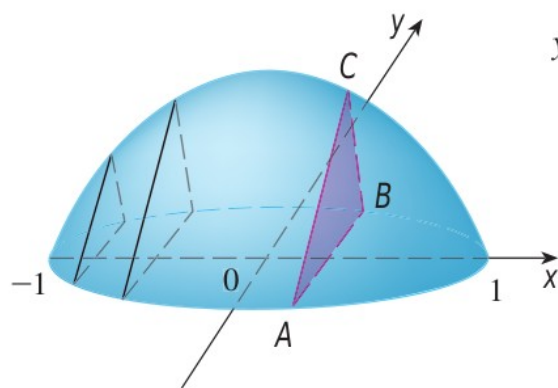
Exemplo 4

y
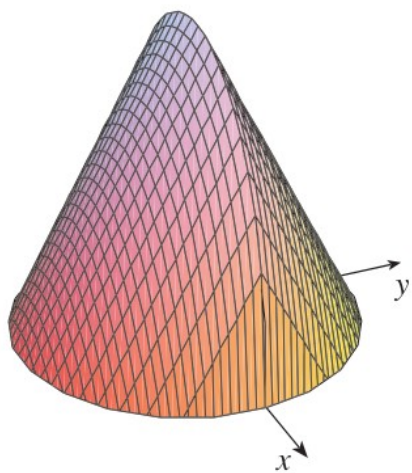
$(1, 1)$

$y = x$

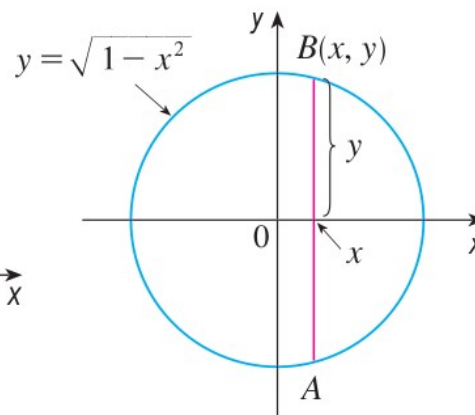$y = x^2$

$\mathcal{R}$

$(0, 0)$
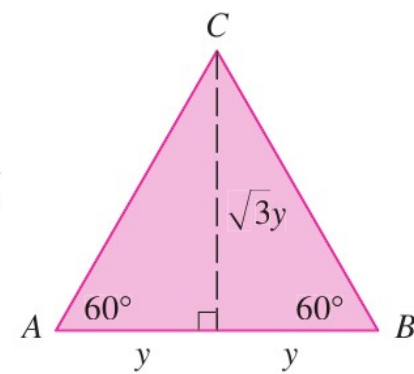
x

(a)

y

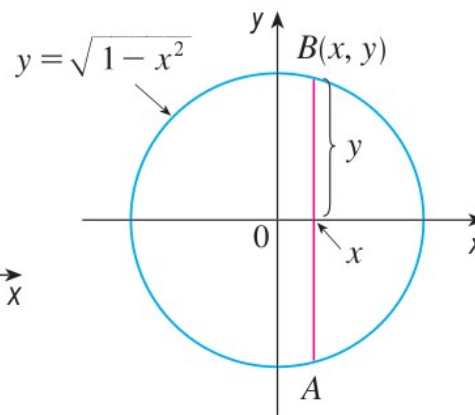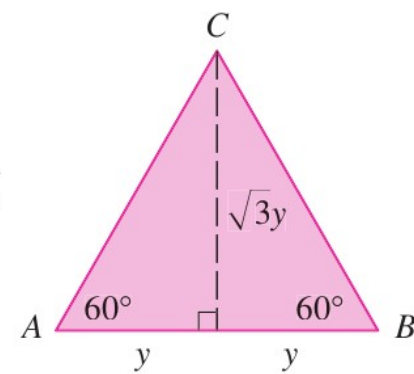0

x

(b)

$A(x)$

x^2

x

(c)

Exemplo 6

(a) The solid   (b) Its base   (c) A cross-section

In figure (b): $y = \sqrt{1 - x^2}$, $B(x, y)$, with labels y and x, point A.

In figure (c): C, $\sqrt{3}\,y$, $60°$, $60°$, A, B, base segments y and y.

Exemplo 4

(a) The solid

$y = \sqrt{1 - x^2}$

$B(x, y)$

(b) Its base

$\sqrt{3}y$

$60°$ $60°$

(c) A cross-section