8.3.

$$V = \iint_{D_{xy}} \left(\int_{z=x^2+y^2}^{2-(x^2+y^2)} dz \right) dxdy = \iint_{D_{xy}} \left\{ 2 - 2(x^2+y^2) \right\} dxdy$$

Skärningskurvan fås ur

$$z = x^2 + y^2 = 2 - (x^2 + y^2)$$

$$D_{xy} = \left\{ (x,y) : x^2 + y^2 \le 1 \right\}$$

Sätt: $\begin{cases} x = r\cos\theta \\ y = r\sin\theta \end{cases}$ $D_{r\theta}: \begin{cases} r: 0 \to 1 \\ \theta: 0 \to 2\pi \end{cases}$ $dxdy = rdrd\theta$

$$V = \iint_{D_{r\theta}} \{2 - 2r^2\} r\,dr\,d\theta$$

$$V = 2\pi \int_{r=0}^{1} \{2 - 2r^2\} r\,dr = \pi\{2\ 1^2 - 1^4\} = \pi$$

SVAR:

Volymen $V = \pi$