

The solid E is most conveniently described if we use spherical coordinates:

$E = \{(\rho, \theta, \phi) \mid 4 \leq \rho \leq 7, \frac{\pi}{2} \leq \theta \leq 2\pi, 0 \leq \phi \leq \frac{\pi}{2}\}$. Then

$$\begin{aligned} \iiint_E f(x, y, z) \, dV &= \int_0^{\pi/2} \int_{\pi/2}^{2\pi} \int_4^7 [f(\rho \sin(\phi) \cos(\theta), \rho \sin(\phi) \sin(\theta), \rho \cos(\phi)) \\ &\quad \times \rho^2 \sin(\phi)] \, d\rho \, d\theta \, d\phi. \end{aligned}$$