

Double Integrals in Polar Coordinates



Question

Which of the integrals below computes the volume of the solid below the hemisphere $z = \sqrt{4 - x^2 - y^2}$ and above the cone $z = \sqrt{x^2 + y^2}$?

A. $\int_0^{2\pi} \int_0^1 (\sqrt{4 - r^2} - r) r \, dr \, d\theta$

B. $\int_0^{2\pi} \int_0^{\sqrt{2}} (\sqrt{4 - r^2} - r) r \, dr \, d\theta$

C. $\int_0^{2\pi} \int_0^{\sqrt{3}} (\sqrt{4 - r^2} - r) r \, dr \, d\theta$

D. $\int_0^{2\pi} \int_0^2 (\sqrt{4 - r^2} - r) r \, dr \, d\theta$