



Question

What does the following integral compute?

$$\int_0^{2\pi} \int_0^{\sqrt{3}} \int_0^{3-r^2} r \, dz \, dr \, d\theta$$

- A. The volume under the paraboloid $z = 3 - x^2 - y^2$ above the xy -plane.
- B. The volume enclosed by the upper half-ball $x^2 + y^2 + z^2 \leq 3$ and $z \geq 0$.
- C. The mass of the solid described by $0 \leq z \leq 3 - r^2$, $0 \leq r \leq 3$, with density $f(r, \theta, z) = r$.
- D. More than one of the above.