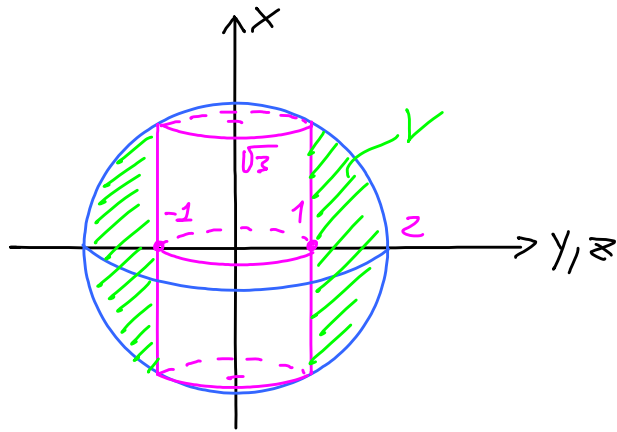


$$x^2 + y^2 + z^2 \leq 4, y^2 + z^2 \geq 1$$

$$z^2$$

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$$\int_V z^2 dx dy dz =$$

$$= \frac{1}{2} \int y^2 + z^2 dx dy dz = \frac{1}{2} \int_0^{2\pi} d\theta \int_{-\sqrt{3}}^{\sqrt{3}} dx \int_1^{\sqrt{4-x^2}} \rho^3 d\rho =$$

$$= \frac{2\pi}{2} \int_{-\sqrt{3}}^{\sqrt{3}} \left[\rho^4 \right]_1^{\sqrt{4-x^2}} dx = \frac{2\pi}{2} \int_{-\sqrt{3}}^{\sqrt{3}} ((4-x^2)^2 - 1) dx$$

$$= \frac{2\pi}{2} \left[15x + \frac{x^5}{5} - \frac{2}{3}x^3 \right]_{-\sqrt{3}}^{\sqrt{3}} = \frac{2\pi}{2} (30\sqrt{3} + \frac{2}{5} \cdot 3\sqrt{3} - \frac{16}{3} \sqrt{3}) =$$

$$= \frac{2\pi\sqrt{3}}{2} \left(15 + \frac{18}{5} \right) = \frac{2\pi\sqrt{3}}{2} \frac{88}{5} = \frac{22\sqrt{3}\pi}{5}$$