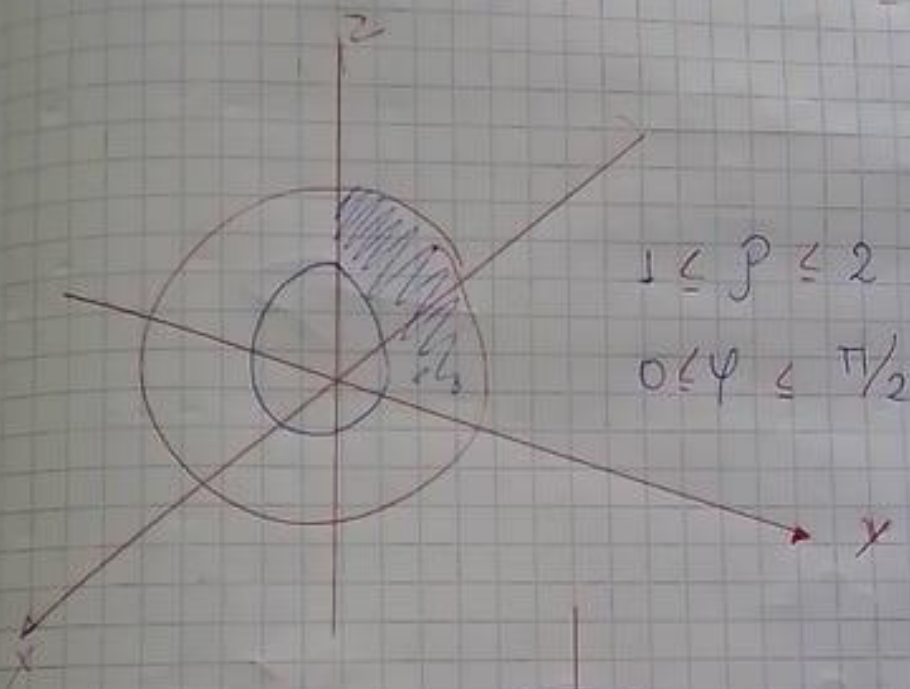


Calcular

$$\iiint_S x e^{(x^2+y^2+z^2)} dx dy dz$$

donde S es el sólido comprendido

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



$$0 \leq \theta \leq \frac{\pi}{2}$$



$$x = \rho \sin \varphi \cos \theta$$

$$y = \rho \sin \varphi \sin \theta$$

$$z = \rho \cos \varphi$$

$$J(\rho, \varphi, \theta) = \rho^2 \sin \varphi$$

$$\iiint_S \rho \sin \varphi \cos \theta e^{\rho^2} \cdot \rho^2 \sin \varphi d\varphi$$

$$\iiint_S \rho^3 \sin^2 \varphi \cos \theta e^{\rho^2} d\varphi$$

$$\int_0^{\pi/2} \int_1^2 \int_0^{\pi/2} \rho^3 e^{\rho^2} \sin^2 \varphi \cos \theta d\theta d\rho d\varphi$$

$$\int_0^{\pi/2} \int_1^2 \rho^3 e^{\rho^2} \sin^2 \varphi \sin \theta \Big|_0^{\pi/2} d\rho d\varphi$$

$$\int_0^{\pi/2} \int_1^2 \rho^3 e^{\rho^2} \sin^2 \varphi d\rho d\varphi$$

$$\int_0^{\pi/2} \frac{\sin^2 \varphi}{2} (p^2 - 1) e^{p^2} \Big|_1^2 d\varphi$$

$$\int_0^{\pi/2} \frac{3e^4}{2} \sin^2 \varphi d\varphi$$

$$\frac{3e^4}{2} \left[\left(\frac{-\sin(2\varphi) + 2\varphi}{4} \right) \right]_{0}^{\pi/2}$$

$$\frac{3e^4}{2} \left(\frac{-\sin(\pi) + \pi}{4} \right)$$

Resp: $\frac{3e^4 \pi}{8}$ //