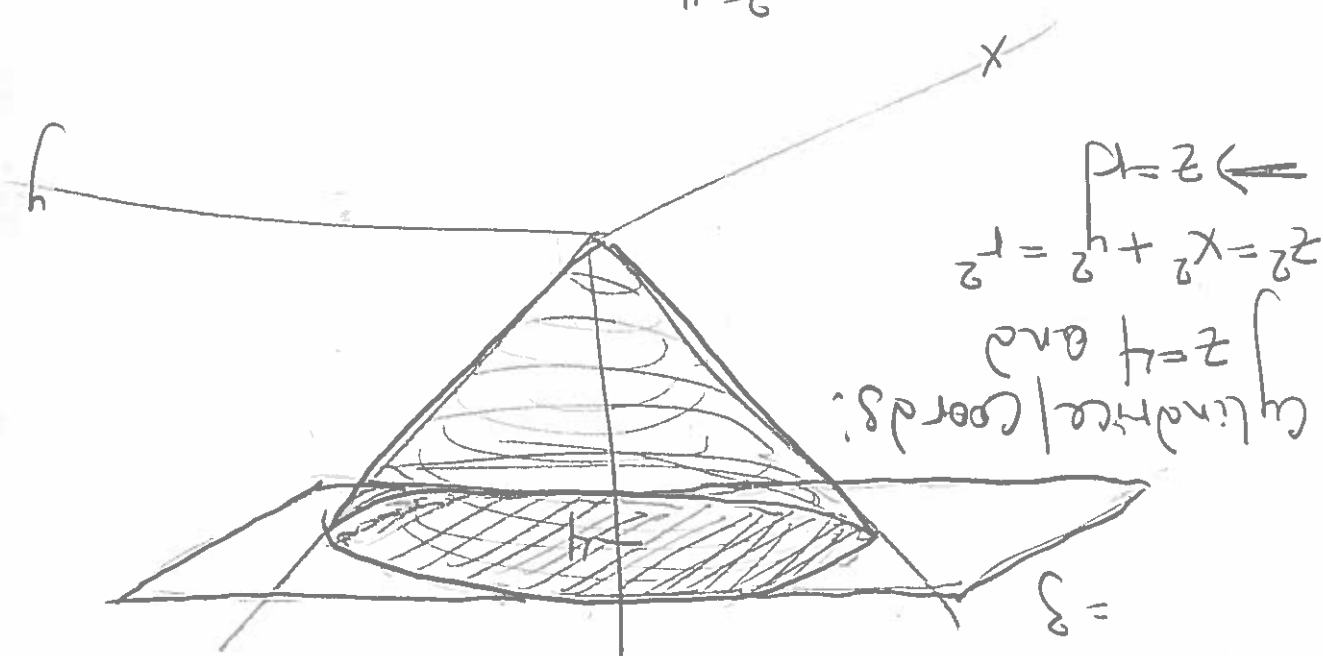


$$\boxed{314.8 \pm 24} \quad \iint_S \vec{F} \cdot \vec{n} \, dS = \iiint_D \text{div} \vec{F} \, dV$$

(Divergence Theorem)

$$\text{div} \vec{F} = \nabla \cdot \vec{F} = 1 + 1 + 1$$



$$3 \int_0^{2\pi} \int_0^4 \int_0^4 r \, dz \, dr \, d\theta = 3 \int_0^{2\pi} \int_0^4 (4r - r^2) \, dr \, d\theta$$

$$= 3 \left(\left(4r^2 - \frac{r^3}{3} \right) \bigg|_0^4 \right) d\theta$$

$$= 3 \left(2(4^2) - \left(\frac{4^3}{3} \right) \right) 2\pi = 3 \left(\frac{3}{2} 4^2 \right) 2\pi$$

$$\boxed{1164\pi}$$