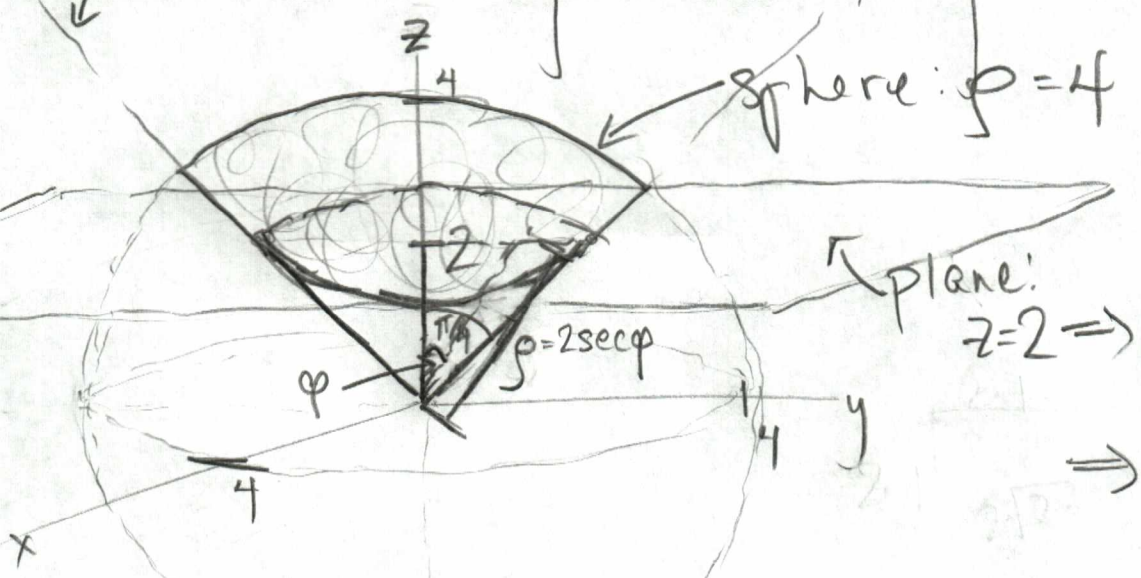
Cal III Exam 3 Sp 17 Feldman #3

AKA THE ICE CREAM CONE PROBLEM*

cone: $z = \sqrt{x^2 + y^2} \Rightarrow z^2 = x^2 + y^2 \rightarrow \varphi = \frac{\pi}{4}$



Volume between two surfaces problem, except the density information means there is more to the integrand $z^2 = \rho^2 \cos^2\varphi$ and now the integral gives the mass of the solid between the surfaces:

$$\int_0^{2\pi} \int_0^{\pi/4} \int_{2\sec\varphi}^{4} (\rho^2 \cos^2\varphi)\rho^2 \sin\varphi \, d\rho \, d\varphi \, d\theta$$

*sorry, I didn't mean to raise my voice at the end, there.