1. (5 points) *An Ice Cream Cone:* Use spherical coordinates to find the volume of the solid bounded by the cone \( z = \sqrt{x^2 + y^2} \) and the sphere \( x^2 + y^2 + z^2 = 1 \).

2. (5 points) *The Egg that Touched Infinity:* In this problem, you should use *cylindrical coordinates.* Let \( R \) be the solid region bounded by the ellipsoid \( 2x^2 + 2y^2 + z^2 = 1 \). Let \( E(x, y, z) = \frac{1}{1 - x^2 - y^2 - z^2} \). Calculate \( \iiint_R E(x, y, z) dV \). *Hints:*

(a) Set up the integral without bounds first. Look at the function inside the integral to determine which variable should be integrated first. That is, which variable makes the first integration easiest?

(b) \( \ln(a) - \ln(b) = \ln\left(\frac{a}{b}\right) \).

(c) Simplify when you can.