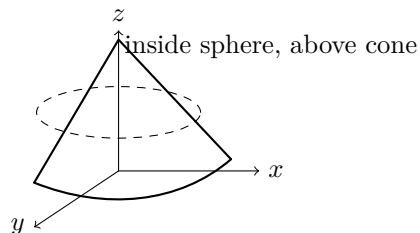


Question 6

Describe with spherical inequalities the solid inside the sphere $\rho = 4$ and above the cone $\phi = \pi/3$. Include the full azimuthal range and explain the meaning of “above.”

Question 6 – Solution

Strategy A smaller polar angle lies closer to the positive z -axis.



Bounds Inside the sphere gives $0 \leq \rho \leq 4$. The full rotational sweep is $0 \leq \theta < 2\pi$. Above the cone means between the positive z -axis and the conical surface, so $0 \leq \phi \leq \pi/3$. Hence

$$\boxed{0 \leq \rho \leq 4, \quad 0 \leq \theta < 2\pi, \quad 0 \leq \phi \leq \frac{\pi}{3}}.$$

Boundary note At $\rho = 0$, angles are not unique, but including all angle values does not create additional geometric points.