Exercise 1. Consider the solid located in the region where $y \leqslant 0$, bounded by the following surfaces:

$$\begin{cases} z = 9 - x^2 - y^2, \\ z = x^2 + y^2 - 9, \\ x^2 + y^2 = 4, \end{cases}$$

with a density function given by $\rho(x,y,z) = e^{-z}$. The mass of this solid is known to be $\cosh(9) - \cosh(5) \approx 3977{,}3$.

Perform the following tasks:

1. Create a rough 3D sketch of the region, clearly labeling the relevant surfaces.
2. Provide a top-down view (projection) of the region onto the xy-plane and label the appropriate curves.
3. Create a side view (projection) of the region onto the yz-plane and label the appropriate curves.
4. Select an coordinate system and describe the bounds of the region within that system.
5. Set up the integral that represents the mass of the solid.