1. (4 points) Let the point \( P = (1, -\sqrt{3}, 2\sqrt{3}) \) be given in rectangular coordinate. Express this point in terms of both cylindrical and spherical coordinates.
2. (3 points) Set up and do not evaluate a triple integration (either in cylindrical or polar coordinates) finding the volume of a solid $E$, where $E$ is enclosed by $z = \sqrt{x^2 + y^2}$ and $z = 2$

3. (3 points) A solid $E$ is given by $E = \{(x, y, z) \in \mathbb{R}^3 : 0 \leq x \leq 1, 0 \leq y \leq \sqrt{4-x^2}, \sqrt{x^2+y^2} \leq z \leq \sqrt{4-x^2-y^2}\}$. Express the solid in spherical coordinate, i.e. give ranges for $(\rho, \theta, \phi)$ that determine $E$. 