1. Consider the following 3-dimensional transformation matrix
\[ \mathcal{R} = \begin{pmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 1 & 0 & 0 \end{pmatrix} \].
(1)

(a) Find Euler angles \( \alpha, \beta, \) and \( \gamma \) that correspond to that transformation (with or without inversion).

(b) Consider the transformation of the \( l = 1 \) spherical harmonic functions, using your Euler angles and Eq. 5-36 of your text.

(c) Check that
\[ Y_{lm}(\mathcal{R} \hat{r}) = \sum_{m'} Y_{lm'}(\hat{r}) \mathcal{D}^{l}_{m'm}(\mathcal{R}) \].
(2)