1) Find eigenvalue and eigenvectors of given linear transformation.
$T : R^3 \rightarrow R^3$
$T(x, y, z) = (x + 2y + 3z , -y + 2z , 2z)$

2) Diagonalize given linear transformation (if possible).
$T : R2 \rightarrow R2$
$T(x, y) = (x, -2x + y)$

3) Diagonalize given transformation matrix.

$$A = \begin{pmatrix} 3 & 0 & 3 \\ 0 & 6 & 0 \\ 3 & 0 & 3 \end{pmatrix}$$