1. Solve the following systems by using eigenvalues and eigenvectors:
   (a) \( x' = x, \quad y' = 2x + 3y; \)
   (b) \( x' = x + 2y + 3z, \quad y' = 2y + z, \quad z' = z. \)

2. Prove that if \( \lambda \) and \( v \) are an eigenvalue, respectively, an eigenvector for the matrix \( A \), then \( x(t) = e^{\lambda t}v \) is a solution for the system \( x' = Ax \).

3. Use the eigenvalue method to solve:
   \[
   x' = \begin{bmatrix}
   a & 0 \\
   0 & b
   \end{bmatrix} x,
   \]
   for all real numbers \( a \) and \( b \). Do the eigenvectors depend on \( a \) and \( b \)?