1. Determine the singular points of the DE and classify each of them as regular or irregular:

\[ x^2 (x - 4)^2 y'' + 3xy' - (x - 4)y = 0 \]

2. Find the indicial equation and indicial roots of the DE:

\[ 2x^2 y'' + xy' - (2x^2 + 1)y = 0 \]
3. Find the eigenvalues and eigenvectors of the matrix \( A = \begin{pmatrix} 4 & -2 & 1 \\ 2 & 0 & 1 \\ 2 & -2 & 3 \end{pmatrix} \)