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

$$x^2(x-2)y'' + 3(x-2)y' + y = 0$$

2. Find the indicial equation and indicial roots of the DE: $2x^2y'' + 3xy' - (x^2+1)y = 0$

3. Find the eigenvalues and eigenvectors of the matrix $A = \begin{pmatrix} 2 & 1 & 2 \\ 1 & 2 & 2 \\ 1 & 1 & 3 \end{pmatrix}$