Consider the matrix $A = \begin{bmatrix} 3 & 1 & 2 \\ -1 & 1 & 2 \\ 0 & 0 & 1 \end{bmatrix}$.

1) Find all the eigenvalues of A. Circle your answer.

2) Find all the eigenspaces of A. Box your answer(s).

3) Find all the eigenvalues of the matrix below:

$$\begin{bmatrix} 1 & x & y & \pi \\ 0 & 2 & 4! & 6.2 \\ 0 & 0 & 3 & 2i \\ 0 & 0 & 0 & 4 \end{bmatrix}$$

4) Suppose A is 5×5 matrix with 5 different eigenvalues. How many nontrivial eigenspaces does A have?