

1. Show that the vector $\vec{v}$ below is an eigenvector for matrix A below.
What is its eigenvalue? (Do not find the other eigenvectors and eigenvalues.)

$$\vec{v} = \begin{bmatrix} 1 \\ 1 \\ 1 \\ 2 \end{bmatrix}, \quad A = \begin{bmatrix} 5 & 0 & -1 & 0 \\ 1 & 3 & 0 & 0 \\ 2 & -1 & 3 & 0 \\ 4 & -2 & -2 & 4 \end{bmatrix}$$

2. For the matrix below,

$$\begin{bmatrix} 0 & 2 & 0 \\ 2 & 2 & -1 \\ 0 & 2 & 1 \end{bmatrix}$$

- (a) Find the characteristic polynomial.

(over)

(b) Find the eigenvalues.