

1. Find the eigenvalues and eigenvectors of

$$A = \begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix}$$

2. Verify that $v = \begin{bmatrix} 1 \\ -1 \end{bmatrix}$ is an eigenvector of

$$B = \begin{bmatrix} 3 & 1 \\ 1 & 3 \end{bmatrix} \text{ and find its eigenvalue.}$$

3. Find the eigenvalues and eigenvectors of

$$C = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 3 & 4 \\ 0 & 4 & 9 \end{bmatrix}$$

4. Find the eigenvalues and eigenvectors of

$$A = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix}$$