

1. Suppose A is $\begin{bmatrix} 1 & 4 & 2 \\ -7 & 11 & 3 \\ 9 & -5 & 3 \end{bmatrix}$ and let $\mathbf{v} = \begin{bmatrix} 2 \\ 2 \\ 2 \end{bmatrix}$ and $\mathbf{w} = \begin{bmatrix} 2 \\ 0 \\ 2 \end{bmatrix}$.

1A. Is \mathbf{v} an eigenvector of A ? Explain. If it is, give the eigenvalue.

1B. Is \mathbf{w} an eigenvector of A ? Explain. If it is, give the eigenvalue.

1C. Fact: One eigenvalue for A is $\lambda = 4$. Find a basis for the corresponding eigenspace.

2. Let $C = \begin{bmatrix} 3 & 4 \\ 6 & 7 \end{bmatrix}$.

2a. Find the characteristic polynomial of C .

2b. Find any real eigenvalues of C or explain why there are none.

3. Suppose B and D are 4 by 4 square matrices and $\text{Det}(B)$ is 4 and $\text{Det}(BD)$ is 8. Find each of the following. Write "Can't Do" if it is not possible to find the answer with the information given.

a. $\text{Det}(D)$.

b. $\text{Det}(DB)$.

c. $\text{Det}(B^T)$.

d. $\text{Det}(B^{-1})$.

e. $\text{Det}(3B)$.

f. $\text{Det}(B^3)$.

g. $\text{Det}(B + B)$.

h. $\text{Det}(B + D)$.