

You will not get any points if your answer is wrong, that is no points to your explanations if your answer is wrong. And of course no points to a correct answer if your explanation or proof is not correct or clear.

YOU must write GOOD Mathematics

1. (a) Test the diagonalizability for the following matrix $A \in M_{n \times n}(\mathbb{R})$,

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

Solution:

- (b) If so, find an invertible matrix Q and a diagonal matrix D such that $Q^{-1}AQ = D$.

Solution: