姓名:_____ 葉均承 應數一線性代數

學號: _____ **Quiz 1** 考試日期: 2024/02/28

1. 請框出答案. 2. 不可使用手機、計算器，禁止作弊!

1. Find the characteristic polynomial, the real eigenvalues and a corresponding eigenvector of matrix A.

$$A = \begin{bmatrix} -1 & 0 & 1 \\ -7 & 2 & 5 \\ 3 & 0 & 1 \end{bmatrix}$$

Answer: (a) the characteristic polynomial: _____.

(b) the eigenvalues and a corresponding eigenvectors: _____.

2. Let A is an $n \times n$ invertible matrix and if λ is an eigenvalue of A with $\vec{v}$ as a corresponding eigenvector. Prove that 1. $\lambda \neq 0$ and 2. $1/\lambda$ is an eigenvalue of A^{-1} with $\vec{v}$ as a corresponding eigenvector.

3. Let A is an $n \times n$ matrix and if λ is an eigenvalue of A with $\vec{v}$ as a corresponding eigenvector. What do you know about the eigenvalues and eigenvectors of $A + cI$ for all scalar c