姓名: SOLUTION　　葉均承　　應數一線性代數

學號: _____　　**Quiz 1**　　考試日期: 2025/02/26

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.

$$A = \begin{bmatrix} 0 & 0 & 0 \\ 2 & -8 & 4 \\ 1 & 0 & -3 \end{bmatrix}$$

Answer: (a) the characteristic polynomial: $-\lambda^3 - 11\lambda^2 - 24\lambda = -\lambda(-8-\lambda)(-3-\lambda)^2$.

(b) the eigenvalues and a corresponding eigenvectors: $(-8, \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}), (-3, \begin{bmatrix} 0 \\ 4 \\ 5 \end{bmatrix}), (0, \begin{bmatrix} 12 \\ 5 \\ 4 \end{bmatrix})$

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2. prove or disprove the following: (證明或反證)

   (a) There can be only one eigenvalue associated with an eigenvector of a linear transformation.

   Solution：

   Section 5-1, problem 23, part d.

   (b) There can be only one eigenvector associated with an eigenvalue of a linear transformation.

   Solution：

   Section 5-1, problem 23, part e.