**Math 225 Quiz 4**

Don't forget to write down clearly your **Name**: and **Net ID:**

**1. Multiple choices (4 points)** Find out the correct answer.

(1). Which of the following statement is correct? Answer: _____.

A. Any matrix in $\mathrm{M}(n, \mathbb{R})$ is diagonalizable.

B. Any matrix in $\mathrm{M}(n, \mathbb{C})$ has a (nonzero) eigenvector in $\mathbb{C}^n$.

C. The characteristic polynomial of a matrix $A \in \mathrm{M}(n, \mathbb{C})$ always has $n$ distinct solutions.

D. If $T : V \to V$ is a linear, then $V$ decomposes into the direct sum of eigenspaces for $T$.

(2). Which of the following statement is true about the matrix? Answer: _____.

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

A. $0$ is an eigenvalue for $A$.

B. The standard vector $e_1 = (1, 0, 0)^t$ is an eigenvector for $A$.

C. $1$ is an eigenvalue for $A$.

D. The standard vector $e_3 = (0, 0, 1)^t$ is an eigenvector for $A$.

**2. Determinant computation (6 points).** Is the matrix

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

diagonalizable inside $\mathrm{M}(2, \mathbb{C})$? If yes, diagonalize it by finding a invertible matrix $B$ such that $BAB^{-1}$ is diagonal; if no, explain why.