Show all your work! 

Mark each statement as True or False.

- ( ) If $Ax = \lambda x$ for some vector $x$, then $\lambda$ is an eigenvalue of $A$.
- ( ) A matrix $A$ is not invertible if and only if 0 is an eigenvalues of $A$.
- ( ) A number $c$ is an eigenvalue of $A$ if and only if the equation $(A - cI)x = 0$ has nontrivial solution.
- ( ) For any square matrix $A$, the eigenvalues can be found by reducing the matrix to echelon form.
- ( ) If $v_1$ and $v_2$ are linearly independent eigenvectors, then they correspond to two distinct eigenvalues.
- ( ) The eigenspace is a null space of a certain matrix.
- ( ) If $\mathbb{R}^n$ has a basis of eigenvectors of $A$, the $A$ is diagonalizable.
- ( ) If $A$ is invertible then it is diagonalizable.
- ( ) Similar matrices always have exactly the same eigenvalues.
- ( ) If a $5 \times 5$ matrix has less than 5 distinct eigenvalues, then $A$ is not diagonalizable.