309 Worksheet 8.1

True or False? Justify your answer:

In the following let A be an $n \times n$ matrix.

(1) If $A\mathbf{x} = \lambda x$ for some vector $\mathbf{x}$, then λ is an eigenvalue of A.
True — False?
REASON:

(2) A matrix A is not invertible if and only if 0 is an eigenvalue of A.
True — False?
REASON:

(3) A number c is an eigenvalue of A if and only if the equation $(A - cI)\mathbf{x} = \mathbf{0}$ has a nontrivial solution.
True — False?
REASON:

(4) If $\mathbf{v}_1$ and $\mathbf{v}_2$ are linearly independent eigenvectors, then they correspond to distinct eigenvalues.
True — False?
REASON:

(5) The eigenvalues of A are in the main diagonal.
True — False?
REASON:

(6) If A has n linearly independent eigenvectors, then A is invertible.
True — False?
REASON: