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Name: _____.

MA 26500-215 Quiz 11

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1. In the following question, V is a finite dimensional vector space, W is a subspace of V and $T: V \rightarrow V$ is a linear operator (i.e., a linear map for V into itself).
 - (a) (2 points) What does it mean for a set $\{\mathbf{v}_1, \dots, \mathbf{v}_n\}$ to be a basis for V ?
 - (b) (2 points) What is the meaning of $\dim V$?
 - (c) (2 points) What is an eigenvalue of T ? What is an eigenvector?
 - (d) (2 points) When is a linear operator T diagonalizable?
 - (e) (2 points) If λ is an eigenvalue of T with respect to W , is λ an eigenvalue of T with respect to V ?
2. (4 points) Suppose that A is a unitary matrix, i.e., $AA^* = I$. (A^* is the conjugate transpose of A , i.e., $A^* = \bar{A}^T$) Show that the only possible eigenvalues of A are
3. (4 points) Suppose that A and B are conjugate matrices. Show that if λ is an eigenvalue of A then it is an eigenvalue of B .