

Quiz 10

ⓘ This is a preview of the published version of the quiz

Started: Nov 17 at 6:38am

Quiz Instructions

Once you open this quiz, you will have 25 minutes to submit it. You will have only **one** submission attempt. The quiz must be **submitted** by 7:59 PM (Atlanta time) on Friday, Nov 6. There are 5 questions after the honor code pledge.

Question 1

0 pts

Please read and attest to the honor statement below:

I understand that this assessment is open-book and open-note, but not open-internet. I may use my class notes, my instructor's notes, and the ILA textbook at <https://textbooks.math.gatech.edu/ila/ila.pdf> (<https://textbooks.math.gatech.edu/ila/ila.pdf>).

However, I will not visit any other websites, use any search engines, or use any calculators or computer aids whatsoever (Matlab, Mathematica, Chegg.com, Geogebra, etc.) as I take this assessment.

This assessment is completely my own work. I will not discuss the answers or any of the contents of this assessment with anyone until the time it is due.

- I attest to my integrity, and I understand that any suspected violation of this policy may be prosecuted to the fullest extent allowable by Georgia Tech.

Question 2

1 pts

Which of the following are correct diagonalizations of the matrix $\begin{pmatrix} 2 & 6 \\ 0 & -1 \end{pmatrix}$? *Select all that apply.*

$\begin{pmatrix} 1 & -2 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} 2 & 0 \\ 0 & -1 \end{pmatrix} \begin{pmatrix} 1 & -2 \\ 0 & 1 \end{pmatrix}^{-1}$

$\begin{pmatrix} -2 & 1 \\ 1 & 0 \end{pmatrix} \begin{pmatrix} -1 & 0 \\ 0 & 2 \end{pmatrix} \begin{pmatrix} -2 & 1 \\ 1 & 0 \end{pmatrix}^{-1}$

$\begin{pmatrix} 2 & 2 \\ 0 & -1 \end{pmatrix} \begin{pmatrix} 2 & 0 \\ 0 & -1 \end{pmatrix} \begin{pmatrix} 2 & 2 \\ 0 & -1 \end{pmatrix}^{-1}$

$\begin{pmatrix} 0 & 1 \\ 1 & -2 \end{pmatrix} \begin{pmatrix} -1 & 0 \\ 0 & 2 \end{pmatrix} \begin{pmatrix} 0 & 1 \\ 1 & -2 \end{pmatrix}^{-1}$

Question 3

1 pts

Suppose that A is a 5×5 matrix with characteristic polynomial $(1 - \lambda)^2(3 - \lambda)^2(\pi - \lambda)$ and also that A is diagonalizable. What is the dimension of the 1-eigenspace of A ?

Question 4

1 pts

Suppose A is a 2×2 matrix whose entries are real numbers, and suppose A has eigenvalue $1 - i$ with corresponding eigenvector $\begin{pmatrix} 2 \\ 1 - i \end{pmatrix}$.

Which of the following must be true?

- \mathbf{A} has eigenvalue $1 + i$ with eigenvector $\begin{pmatrix} 2 \\ 1 + i \end{pmatrix}$
- \mathbf{A} has eigenvalue $1 - i$ with eigenvector $\begin{pmatrix} 2 \\ 1 + i \end{pmatrix}$
- \mathbf{A} has eigenvalue $1 + i$ with eigenvector $\begin{pmatrix} 2 \\ 1 - i \end{pmatrix}$
- \mathbf{A} has eigenvalue $1 + i$ with eigenvector $\begin{pmatrix} -2 \\ -1 + i \end{pmatrix}$

Question 5

1 pts

If \mathbf{A} is a diagonalizable 10×10 matrix, then \mathbf{A} must have 10 distinct eigenvalues.

- True
- False

Question 6

1 pts

Suppose that \mathbf{A} is a 4×4 matrix with eigenvalues 0, 1, and 2, where the eigenvalue 2 has geometric multiplicity 2 (meaning that the dimension of the 2-eigenspace is 2). Which of the following statements must be true? *Select all that apply.*

- \mathbf{A} is diagonalizable
- \mathbf{A} is not diagonalizable
- \mathbf{A} is invertible
- \mathbf{A} is not invertible

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