

Quiz 6

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

Started: Oct 12 at 5:31pm

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, Oct 9. 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

Determine whether each statement is True or False.

Every linear transformation $T : \mathbb{R}^{10} \rightarrow \mathbb{R}^1$ is onto. [Select]

If a linear transformation $T : \mathbb{R}^4 \rightarrow \mathbb{R}^4$ is onto, then it must also be one-to-one.

[Select]

Question 3

1 pts

Let $e_1 = \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}$, $e_2 = \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix}$, $e_3 = \begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix}$ be the standard basis of \mathbb{R}^3 , and

suppose $T : \mathbb{R}^3 \rightarrow \mathbb{R}^3$ is a linear transformation satisfying

$$T(e_1) = e_2 + e_3, \quad T(e_2) = e_1 + e_3, \quad T(e_3) = e_1.$$

What is the standard matrix of T ?

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

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

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

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

Question 4

1 pts

Suppose that A is a 5×3 matrix with $\text{rank}(A) = 2$. Consider the associated matrix transformation $T(v) = Av$. Is T one-to-one?

- Yes
- No
- It is not possible to determine from the given information if T is one-to-one

Question 5**1 pts**

Suppose that $T : \mathbb{R}^2 \rightarrow \mathbb{R}^3$ is a linear transformation and that the range of T is a line. Which of the following can we conclude about T ? Select all that apply.

- T is one-to-one
- T is onto
- T is not one-to-one
- T is not onto

Question 6**1 pts**

Let $T : \mathbb{R}^2 \rightarrow \mathbb{R}^2$ be the linear transformation given by first rotating counterclockwise by $\frac{3\pi}{2}$ (or 270°) and then scaling (or dilating) by a factor of 3 . What is the standard matrix for T ? *Each entry in your answer must be a number (no trigonometry functions allowed).*

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