Quiz 4

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

Started: Sep 26 at 4:25am

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, Sep 25. 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

Let V be the set of vectors in $\mathbb{R}^3$ given by $\{(a,b,c) \text{ in } \mathbb{R}^3 \mid a = -c \text{ and } b = 0\}$.

(a) Does V contain the 0 vector? [Select]

(b) Is V closed under addition? In other words, if u and v are in V does it follow that $u + v$ is in V? [Select]

(c) Is V closed under scalar multiplication? In other words if v is in V and c is a real number does it follow that cv is in V? [Select]

(d) Is V a subspace of $\mathbb{R}^3$? [Select]

Question 3

1 pts

Let V be the set of vectors in $\mathbb{R}^3$ given by $\{(a, b, c) \text{ in } \mathbb{R}^3 \mid c \geq 0\}$.

(a) Does V contain the 0 vector? [Select]

(b) Is V closed under addition? In other words, if u and v are in V does it follow that $u + v$ is in V? [Select]

(c) Is V closed under scalar multiplication? In other words if v is in V and c is a real number does it follow that cv is in V? [Select]

(d) Is V a subspace of $\mathbb{R}^3$? [Select]

Question 4

1 pts

When is the set of solutions to a matrix equation a subspace?

- ◯ Sometimes
- ◯ Always
- ◯ Never

Question 5

1 pts

Consider the matrix

$$A = \begin{pmatrix} 1 & 2 & 1 & 1 \\ 1 & 4 & 1 & 1 \\ 5 & 6 & 2 & 1 \\ 1 & 2 & 1 & 1 \end{pmatrix},$$

which can be row reduced to the following matrix

$$\begin{pmatrix} 1 & 0 & 0 & -1/3 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 4/3 \\ 0 & 0 & 0 & 0 \end{pmatrix}.$$

Which of the following collection of vectors spans $\mathbf{Col}(A)$?

- [ ] $\left\{\begin{pmatrix}1\\1\\5\\1\end{pmatrix}, \begin{pmatrix}1\\1\\2\\1\end{pmatrix}, \begin{pmatrix}1\\1\\1\\1\end{pmatrix}\right\}$
- [ ] $\left\{\begin{pmatrix}1\\1\\5\\1\end{pmatrix}, \begin{pmatrix}2\\4\\6\\2\end{pmatrix}, \begin{pmatrix}1\\1\\2\\1\end{pmatrix}\right\}$
- [ ] $\left\{\begin{pmatrix}1/3\\0\\-4/3\\1\end{pmatrix}\right\}$
- [ ] $\left\{\begin{pmatrix}1\\0\\0\\0\end{pmatrix}, \begin{pmatrix}0\\1\\0\\0\end{pmatrix}, \begin{pmatrix}0\\0\\1\\0\end{pmatrix}\right\}$

Question 6

1 pts

Suppose that A is a 3×4 matrix that can be reduced to the following reduced row echelon form

$$\begin{pmatrix}1 & 0 & 0 & 1\\0 & 0 & 1 & 2\\0 & 0 & 0 & 0\end{pmatrix}.$$

Which of the following collections of vectors spans $\mathbf{Nul}(A)$?

- $\left\{ \begin{pmatrix} 0 \\ 1 \\ 0 \\ 0 \end{pmatrix}, \begin{pmatrix} -1 \\ 0 \\ -2 \\ 1 \end{pmatrix} \right\}$
- The first and third columns of the *original* matrix A
- $\left\{ \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix} \right\}$
- $\left\{ \begin{pmatrix} 0 \\ 1 \\ 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 \\ 0 \\ 2 \\ 1 \end{pmatrix} \right\}$

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