

### Linear Algebra. Test 1. Variant 1.

First name	Last name	Group	Points#1
		BS1-	

I am, \_\_\_\_\_ (initials), confirming that I have read the following rules and agree to comply with them, that all solutions on this paper is my own work.

\_\_\_\_\_ (signature)

Rules:

- no talking AT ALL is allowed during the exam and after it (if you are still in the room)
- when time is up, you have to put down your pen (pencil) and do NOT write anything else
- you can NOT leave your seat till the end of the test
- any electronic devices are not allowed

1. Find linear independent vectors (exclude dependent). (4 points)

Find rank(A) if A is a composition of this vectors. Find rank(A<sup>T</sup>). (1 point)

$$\vec{a} = \begin{pmatrix} 4 \\ 0 \\ 3 \\ 2 \end{pmatrix} \quad \vec{b} = \begin{pmatrix} 1 \\ -7 \\ 4 \\ 5 \end{pmatrix} \quad \vec{c} = \begin{pmatrix} 7 \\ 1 \\ 5 \\ 3 \end{pmatrix} \quad \vec{d} = \begin{pmatrix} -5 \\ -3 \\ -3 \\ -1 \end{pmatrix} \quad \vec{e} = \begin{pmatrix} 1 \\ -5 \\ 2 \\ 3 \end{pmatrix}$$

### Linear Algebra. Test 1. Variant 1.

First name	Last name	Group	Points#2
		BS1-	

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\_\_\_\_\_ (signature)

2. Find E:  $EA = U$  (U – upper-triangular matrix). (3 points)

Find  $L = E^{-1}$ . (2 points)

$$A = \begin{bmatrix} 2 & 5 & 7 \\ 6 & 4 & 9 \\ 4 & 1 & 8 \end{bmatrix}$$

### Linear Algebra. Test 1. Variant 1.

First name	Last name	Group	Points#3
		BS1-	

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\_\_\_\_\_ (signature)

3. Find complete solution for the system  $Ax=b$ : (4 points)

Provide an example of vector  $b$  that makes this system unsolvable. (1 point)

$$\begin{cases} 6x_1 - 2x_2 + x_3 - 4x_4 = 7 \\ 4x_1 + 2x_2 + 14x_3 - 31x_4 = 18 \\ 2x_1 - x_2 + 3x_3 - 7x_4 = 5 \end{cases}$$