

MAC 3105-2A
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Quiz 2
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Print Name _____

Signature _____

INSTRUCTIONS:

- Write answer in the space provided after the problems.
- Clearly show ALL work and circle/box answer.
- I is the **Identity Matrix** of the required dimension.
- Keep Calm and Enjoy Linear

1. DEFINITIONS

Write down the definition of the following terminologies. Let $T: \mathbb{R}^n \rightarrow \mathbb{R}^m$ be a linear transform.

(1) T is **Injective**

(2) T is **Surjective**

2. 'TRICK OR TREAT'

Determine whether the statement is true or false. If it is true, say so; if it is false, explain why or give an example that disproves the statement.

- (1) Let $T: \mathbb{R}^3 \rightarrow \mathbb{R}^4$ be a linear transform. If $T(u_1)$, $T(u_2)$ and $T(u_3)$ are linear independent, then u_1, u_2, u_3 are linear independent.

- (2) Let A be a 4 by 3 matrix, then $AX = I$ always has a solution.

- (3) Let A and B be matrices. If $AB = I$, then A and B are invertible.

- (4) If the Kernel of a linear transform $T: \mathbb{R}^3 \rightarrow \mathbb{R}^3$ is $\{0\}$, then the matrix representing T has a pivot on each row.

- (5) If a matrix A is invertible, then $AX = B$ has a unique solution for every vector B .

3. FIND THE INVERSE

Find the inverse of the following matrix A if it exists.

$$A = \begin{bmatrix} 1 & 0 & 0 \\ 1 & 2 & 0 \\ 3 & 2 & 3 \end{bmatrix}$$