NAME:
HABIB ID:

SOLUTION A.

LINEAR ALGEBRA

SPRING 2023

QUIZ 2 L1

Max Marks: 10

Time: 7 minutes

Prove: The inverse of a nonsingular matrix A is unique.

Let B and C be 2 distinct inverses of A

$\because$ B is an inverse, $BA = I$ —①

Multiply both sides of ① by C:

$(BA)C = IC = C$ —②

But $(BA)C = B(AC) = BI = B$ ($\because AC = I$) —③

$\therefore$ From ② and ③, $B = C$. Inverse is unique

OR

NAME:
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SOLUTION B

LINEAR ALGEBRA

SPRING 2023

QUIZ 2 L1

Max Marks: 10

Time: 7 minutes

Prove: If A and B are invertible matrices of the same size, then $(AB)^{-1} = B^{-1}A^{-1}$.

$$(AB)(B^{-1}A^{-1}) = A(BB^{-1})A^{-1}$$

$$= AIA^{-1} = AA^{-1} = I \quad \text{——— (1)}$$

Also, $$(B^{-1}A^{-1})(AB) = B^{-1}(A^{-1}A)B$$

$$= B^{-1}IB = B^{-1}B = I \quad \text{——— (2)}$$

From (1) and (2), $(AB)^{-1} = B^{-1}A^{-1}$