Computational Linear Algebra, Assignment 2, Part I

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1. We know that $A^{-1}A = I$. Now, suppose there is another matrix J such that $AJ = A = JA$. So,

$$\begin{aligned} AJ &= A \\ \therefore A^{-1}AJ &= A^{-1}A \\ \therefore IJ &= I \\ \therefore J &= I \end{aligned}$$

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2. We know that $A^{-1}A = I$. So,

$$\begin{aligned} (A^{-1}A) &= I \\ \therefore A(A^{-1}A) &= AI \\ \therefore (AA^{-1})A &= A = AI \\ \therefore AA^{-1} &= I \end{aligned}$$

because we know from above that $IA = A = AI$, and we know from above that I is unique. ■