

Problem 1

Suppose that we know that $A^{-1} = \begin{bmatrix} 1 & 3 \\ 2 & 5 \end{bmatrix}$. Solve the matrix equation $AX = B$ to find x and y where $X = \begin{bmatrix} x \\ y \end{bmatrix}$, and $B = \begin{bmatrix} 1 \\ 3 \end{bmatrix}$.

Problem 2

Suppose we are given $A^{-1} = \begin{bmatrix} 1 & 4 & 0 \\ 2 & 3 & 0 \\ 4 & 2 & 2 \end{bmatrix}$. Solve the matrix equation $AX = B$ to find x , y and z where $X = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$, and $B = \begin{bmatrix} -1 \\ 2 \\ 3 \end{bmatrix}$.

Problem 3

Show that a square matrix with a zero row is not invertible.

Problem 4

Let $A = \text{diag}(a_1, a_2, \dots, a_n)$. Show that A is invertible if and only if each $a_i \neq 0$.

Problem 5

Let $A = \begin{bmatrix} 1 & 2 & -3 \\ 2 & 0 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 2 \\ 1 & -1 \\ 0 & 2 \end{bmatrix}$. Find $(AB)^T$.