1. (15 points) Solve the system

$$\begin{bmatrix} 1 & 0 & 1 \\ -4 & 1 & -1 \\ 6 & -2 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ 7 \\ 1 \end{bmatrix}$$

by finding A^{-1} where $A = \begin{bmatrix} 1 & 0 & 1 \\ -4 & 1 & -1 \\ 6 & -2 & 1 \end{bmatrix}$.

$A\vec{x} = C$

$A^{-1}A\vec{x} = A^{-1}C$

$IX = A^{-1}C$

find A^{-1}.

$$\left[\begin{array}{ccc|ccc} 1 & 0 & 1 & 1 & 0 & 0 \\ -4 & 1 & -1 & 0 & 1 & 0 \\ 6 & -2 & 1 & 0 & 0 & 1 \end{array}\right]$$

$$\left[\begin{array}{ccc|ccc} 1 & 0 & 1 & 1 & 0 & 0 \\ 0 & 1 & 3 & 4 & 1 & 0 \\ 6 & -2 & 1 & 0 & 0 & 1 \end{array}\right]$$

$$\left[\begin{array}{ccc|ccc} 1 & 0 & 1 & 1 & 0 & 0 \\ 0 & 1 & 3 & 4 & 1 & 0 \\ 0 & -2 & -5 & -6 & 0 & 1 \end{array}\right]$$

$$\left[\begin{array}{ccc|ccc} 1 & 0 & 1 & 1 & 0 & 0 \\ 0 & 1 & 3 & 4 & 1 & 0 \\ 0 & 0 & 1 & 2 & 2 & 1 \end{array}\right]$$

$$\left[\begin{array}{ccc|ccc} 1 & 0 & 0 & -1 & -2 & -1 \\ 0 & 1 & 0 & -2 & -5 & -3 \\ 0 & 0 & 1 & 2 & 2 & 1 \end{array}\right]$$

$$A^{-1} = \begin{bmatrix} -1 & -2 & -1 \\ -2 & -5 & -3 \\ 2 & 2 & 1 \end{bmatrix}$$

$$A^{-1}C = \begin{bmatrix} -1 & -2 & -1 \\ -2 & -5 & -3 \\ 2 & 2 & 1 \end{bmatrix} \begin{bmatrix} 1 \\ 7 \\ 1 \end{bmatrix}$$

$$= \begin{bmatrix} -1-14-1 \\ -2-35-3 \\ 2+14+1 \end{bmatrix} = \begin{bmatrix} -16 \\ -40 \\ 17 \end{bmatrix}$$

$$\begin{bmatrix} X \\ Y \\ Z \end{bmatrix} = \begin{bmatrix} -16 \\ -40 \\ 17 \end{bmatrix}$$

$X = -16$
$Y = -40$
$Z = 17$

$X = -16$
$Y = -40$
$Z = 17$

$$\begin{bmatrix} 1 & 0 & 1 \\ -4 & 1 & -1 \\ 6 & -2 & 1 \end{bmatrix} \quad \begin{bmatrix} -1 & -2 & -1 \\ -2 & -4 & -3 \\ 2 & 2 & 1 \end{bmatrix}$$

4.

8 - 4 - 2