Fall 
$$7025$$

Basic Poblems

1. coeff. matrix: argumented matrix:

$$\begin{bmatrix}
1 - 2 - 2 \\
2 - 3 - 5 \\
-2 2 7
\end{bmatrix}$$

$$\begin{bmatrix}
2 - 2 - 2 \\
2 - 3 - 5
\end{bmatrix}$$

$$\begin{bmatrix}
1 - 2 - 2 & 2 \\
2 - 3 - 5 & 7
\end{bmatrix}$$

$$\begin{bmatrix}
2 - 2 & 2 \\
2 - 3 - 5 & 7
\end{bmatrix}$$

$$\begin{bmatrix}
2 - 2 & 2 \\
2 - 3 - 5 & 7
\end{bmatrix}$$

$$\begin{bmatrix}
1 - 2 - 2 & 2 \\
2 - 3 - 5 & 7
\end{bmatrix}$$

$$\begin{bmatrix}
2 - 3 - 5 & 7 \\
-2 & 2 & 7
\end{bmatrix}$$

$$\begin{bmatrix}
1 - 2 - 2 & 2 \\
2 - 3 - 5 & 7
\end{bmatrix}$$

$$\begin{bmatrix}
1 - 2 - 2 & 7 \\
2 - 2 & 7 - 1
\end{bmatrix}$$

Assignment 1

$$x_1 + 3x_2 + 2x_4 = 15$$
 $-2x_1 - 6x_2 - 3x_4 = -27$ 

3. Plug in values:

(1) - 2(3) + 2 - 2(3) = 1 - 6 + 2 - 6 = -9

1 - 3 - 2 - 2(3) = 1 - 3 - 2 - 6 = -10

-3(1) + 8(3) - 6(2) + 4(3) = -3 + 24 - 12 + 12 = 21

2(3)-7(2)+7(3)=6-14+21=13

4. Agrented matrix:

$$\begin{bmatrix} 1 & -2 & -2 & -7 \\ -1^{+1} & 3^{-2} & 7^{-2} & 10 \\ 2 & -6 & -3 & -18 \end{bmatrix} \xrightarrow{R_{2} \leftarrow R_{2} + R_{1}}$$

$$\begin{bmatrix}
1 & -2 & -2 & -7 \\
0 & 1 & 0 & 3 \\
-2 & -6 & -3 & -18
\end{bmatrix}$$

$$R_3 \in R_3 - 2R_1$$

$$\begin{bmatrix} 1 & 0 & 0 & 3 \\ 0 & 1 & 0 & 3 \\ 0 & 1 & 0 & 3 \\ 0 & 0 & 1 & 2 \end{bmatrix} \quad \begin{array}{c} x_1 = 3 \\ x_2 = 3 \\ x_3 = 3 \end{array}$$

(3,3,2) is the unique solution.

$$\begin{cases} 9 & 5 & -7 & -5 & -9 \\ 5 & -7 & 1 & -2 & -9 \\ 5 & 7 & -5 & 2 & 1 \end{cases} \qquad \begin{cases} 9 & 5 & -7 & 5 & -9 \\ 5 & 7 & -5 & 2 & 1 \end{cases} \qquad \begin{cases} 9 & 5 & -7 & 5 & -9 \\ 5 & 7 & 1 & 70 & 2 & 2 & 90 \\ 5 & 1 & -10 & 6 & -5 \\ -5 & -7 & 5 & -2 & -1 \end{cases} \qquad \begin{cases} 9 & 5 & -7 & -5 & -9 \\ -5 & -9 & 21 & -14 & 15 \\ -5 & -7 & 5 & -2 & -1 \end{cases} \qquad \begin{cases} 9 & 5 & -7 & -5 & -9 \\ 20 & 26 & -4 & -4 & 6 \\ -5 & -7 & 5 & -2 & -1 \end{cases} \qquad \begin{cases} 9 & 5 & -7 & -5 & -9 \\ 20 & 26 & -4 & -4 & 6 \\ -10 & -20 & 5 & 0 & -8 \\ -5 & -7 & 5 & -7 & -1 \end{cases} \qquad \begin{cases} 9 & 3 & 6 & 2 \\ -10 & -20 & 5 & 0 & -8 \\ -5 & -7 & 5 & -7 & -1 \end{cases} \qquad \begin{cases} 9 & 3 & 6 & 2 \\ -10 & -20 & 5 & 0 & -8 \\ -5 & -7 & 5 & -7 & -1 \end{cases}$$

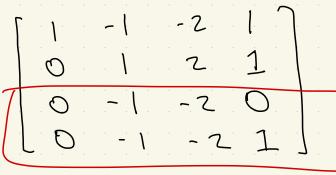
6.  $x_1 = -3 - x_2 + 4x_6 - 5x_7$   $x_2$  is free

X3 = -4 - X6 - 3 X7 X4 is free

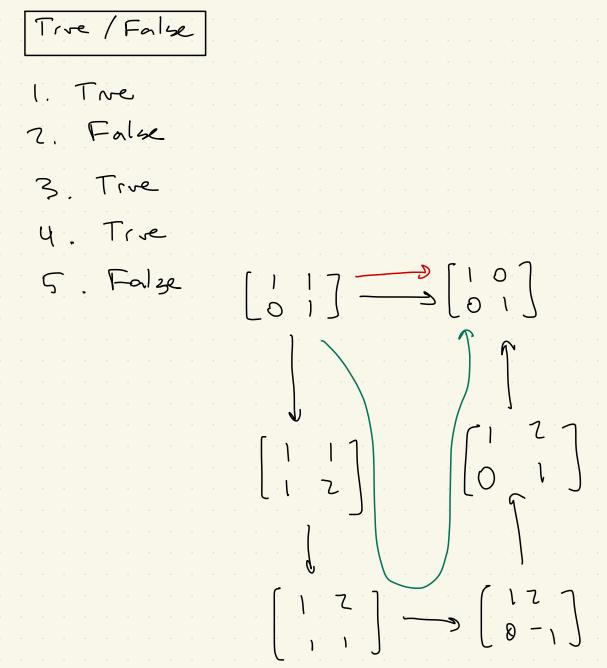
x5 = 2 - 5 x6 + 3 x7

to is free

X7 is free



INCONSISTENT



6. True

7. False

8. Falze

9. Falu

X+y=1 X+y=2

x+y+z=1 x+y+z=2

X+7=3

There are no values of h so that
the system has infinitely many solutions.
This would require the second equations to
be a multiple of the first, which is

This rould require the second egention to be a multiple of the first, which is not possible.

$$\begin{bmatrix} 2 & 6 & 1 \\ 3 & 9 & 0 \end{bmatrix}^{N}$$

$$\begin{bmatrix} 6 & 18 & 3 \\ 6 & 18 & 0 \end{bmatrix}^{N} \begin{bmatrix} 2 & 6 & 1 \\ 0 & 18 & 0 \end{bmatrix}^{N}$$

$$b) k = 0$$

$$k = 0$$

$$\begin{bmatrix} 0 & 2 & 1 \\ 3 & 9 & 0 \end{bmatrix}^{N} \begin{bmatrix} 1 & 3 & 0 \\ 0 & 1 & 1/2 \end{bmatrix}^{N}$$

$$k = \frac{7}{3}$$

$$k = \frac{9}{2}$$

$$\begin{bmatrix} 27 & 2 & 1 \\ 3 & 9 & 9/2 \end{bmatrix} \sim \begin{bmatrix} 6 & 18 & 9 & 1 \\ 6 & 18 & 9 & 1 \end{bmatrix}$$

$$\lambda = \begin{bmatrix} 6 & 18 & 9 & 1 \\ 0 & 8 & 0 & 1 \end{bmatrix}$$