

8. Solve the linear system by using the Gauss-Jordan elimination method. No points for using any other method. (15 pts)

$$\begin{cases} x - 3y + 2z = 10 \\ -x + 3y - z = -6 \\ -x + 3y + 2z = 6 \end{cases}$$

$$\left[\begin{array}{ccc|c} 1 & -3 & 2 & 10 \\ -1 & 3 & -1 & -6 \\ -1 & 3 & 2 & 6 \end{array} \right] \xrightarrow{\substack{[2]+[1] \\ [3]+[1]}} \left[\begin{array}{ccc|c} 1 & -3 & 2 & 10 \\ 0 & 0 & 1 & 4 \\ 0 & 0 & 4 & 16 \end{array} \right]$$

$$\xrightarrow{\substack{[1]+(-2)[2] \\ [3]+(-4)[2]}} \left[\begin{array}{ccc|c} 1 & -3 & 0 & 2 \\ 0 & 0 & 1 & 4 \\ 0 & 0 & 0 & -4 \end{array} \right]$$

$$x - 3y = 2, \quad \text{so } x = 3y + 2 \\ z = 4$$

$$\begin{cases} x = 3y + 2 \\ y = \text{any number} \\ z = 4 \end{cases}$$