ex 4

$$\begin{cases} 4x + 12y - 8z = 2 \\ 2x + 6y - 4z = 8 \\ 4x + 2y - 6z = -14 \end{cases}$$

$$\left[\begin{array}{ccc|c} 4 & 12 & -8 & 2 \\ 2 & 6 & -4 & 8 \\ 4 & 2 & -6 & -14 \end{array}\right] \begin{array}{l} \frac{1}{2}R_1 \to R_1 \\ \frac{1}{2}R_2 \to R_2 \\ \frac{1}{2}R_3 \to R_3 \end{array}$$

$$\left[\begin{array}{ccc|c} \textcircled{2} & 6 & -4 & 1 \\ 1 & 3 & -2 & 4 \\ 2 & 1 & -3 & -7 \end{array}\right] \quad R_1 \leftrightarrow R_2$$

$$\left[\begin{array}{ccc|c} 1 & 3 & -2 & 4 \\ \textcircled{2} & 6 & -4 & 1 \\ 2 & 1 & -3 & -7 \end{array}\right] \quad -1R_3 + R_2 \to R_2$$

$$\left[\begin{array}{ccc|c} 1 & 3 & -2 & 4 \\ 0 & 5 & -1 & 8 \\ \textcircled{2} & 1 & -3 & -7 \end{array}\right] \quad -2R_1 + R_3 \to R_3$$

$$\left[\begin{array}{ccc|c} 1 & 3 & -2 & 4 \\ 0 & \textcircled{5} & -1 & 8 \\ 0 & -5 & 1 & -15 \end{array}\right] \quad \frac{1}{5}R_2 \to R_2$$

$$\left[\begin{array}{ccc|c} 1 & 3 & -2 & 4 \\ 0 & 1 & -\frac{1}{5} & \frac{8}{5} \\ 0 & \textcircled{-5} & 1 & -15 \end{array}\right] \quad 5R_2 + R_3 \to R_3$$

$$\left[\begin{array}{ccc|c} 1 & 3 & -2 & 4 \\ 0 & 1 & -\frac{1}{5} & \frac{8}{5} \\ 0 & 0 & 0 & -7 \end{array}\right] \quad 0 = -7 \quad \text{False}$$

$\boxed{\emptyset}$