1-1
1

Ex: Solve $\left[\begin{array}{ccc|c} 1 & -4 & 9 & 0 \\ 0 & 1 & 7 & 0 \\ 0 & 0 & 3 & 0 \end{array}\right]$

$3x_3 = 0 \Rightarrow x_3 = 0$

$x_2 + 7x_3 = 0 \Rightarrow x_2 = 0$

$x_1 - 4x_2 + 9x_3 = 0 \Rightarrow x_1 = 0$

$(0, 0, 0)$

H
8

Ex: Solve $\left[\begin{array}{cccc|c} 1 & -2 & 0 & 3 & -2 \\ 0 & 1 & 0 & -4 & 7 \\ 0 & 0 & 1 & 0 & 6 \\ 0 & 0 & 0 & 1 & -3 \end{array}\right]$

$x_4 = -3$

$x_3 = 6$

$x_2 - 4x_4 = 7 \Rightarrow x_2 = -5$

$x_1 - 2x_2 + 3x_4 = -2 \Rightarrow x_1 = -3$

$(-3, -5, 6, -3)$

Ex: Solve $x_1 - 3x_2 + 4x_3 = -4$

$3x_1 - 7x_2 + 7x_3 = -8$

$-4x_1 + 6x_2 - x_3 = 7$

$$\left[\begin{array}{ccc|c} 1 & -3 & 4 & -4 \\ 3 & -7 & 7 & -8 \\ -4 & 6 & -1 & 7 \end{array}\right]$$

$$\left[\begin{array}{ccc|c} 1 & -3 & 4 & -4 \\ 3 & -7 & 7 & -8 \\ -4 & 6 & -1 & 7 \end{array}\right] \sim \left[\begin{array}{ccc|c} 1 & -3 & 4 & -4 \\ 0 & 2 & -5 & 4 \\ -4 & 6 & -1 & 7 \end{array}\right] \sim$$

$$\left[\begin{array}{ccc|c} 1 & -3 & 4 & -4 \\ 0 & 2 & -5 & 4 \\ 0 & -6 & 15 & -9 \end{array}\right] \sim \left[\begin{array}{ccc|c} 1 & -3 & 4 & -4 \\ 0 & 2 & -5 & 4 \\ 0 & 0 & 0 & 3 \end{array}\right]$$

no solution

ϕ

Ex: Solve $x_1 - 3x_2 = 5$

$-x_1 + x_2 + 5x_3 = 2$

$x_2 + x_3 = 0$

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

$$\left[\begin{array}{ccc|c} 1 & -3 & 0 & 5 \\ -1 & 1 & 5 & 2 \\ 0 & 1 & 1 & 0 \end{array}\right] \sim \left[\begin{array}{ccc|c} 1 & -3 & 0 & 5 \\ 0 & -2 & 5 & 7 \\ 0 & 1 & 1 & 0 \end{array}\right] \sim$$

$$\left[\begin{array}{ccc|c} 1 & -3 & 0 & 5 \\ 0 & 1 & 1 & 0 \\ 0 & -2 & 5 & 7 \end{array}\right] \sim \left[\begin{array}{ccc|c} 1 & -3 & 0 & 5 \\ 0 & 1 & 1 & 0 \\ 0 & 0 & 7 & 7 \end{array}\right]$$

$7x_3 = 7 \Rightarrow x_3 = 1$

$x_2 + x_3 = 0 \Rightarrow x_2 = -1$

$x_1 - 3x_2 = 5 \Rightarrow x_1 = 2$

$(2, -1, 1)$