

$$7. \left[\begin{array}{cc|c} -1 & 3 & 0 \\ -3 & 9 & 0 \end{array} \right] \rightarrow \left[\begin{array}{cc|c} -1 & 3 & 0 \\ 0 & 0 & 0 \end{array} \right]$$

$$\therefore -x_1 + 3x_2 = 0$$

$$\therefore x_1 = 3x_2$$

$$\therefore x_1 = 3s, x_2 = s, \forall s \in \mathbb{R}$$

$$12. (a) \left[\begin{array}{cc|c} 2 & -1 & 2 \\ -6 & 3 & 4 \end{array} \right] \xrightarrow{[2]+3[1]} \left[\begin{array}{cc|c} 2 & -1 & 2 \\ 0 & 0 & 10 \end{array} \right]$$

$$\therefore 0 \cdot x_1 + 0 \cdot x_2 = 10$$

$$\text{i.e., } 0 = 10 \quad \text{---} \times$$

No solution!

$$(b) \left[\begin{array}{ccc|c} 2 & 0 & 1 & -1 \\ -3 & 1 & 4 & 1 \\ -1 & 1 & 5 & 1 \end{array} \right] \xrightarrow{[1] \leftrightarrow -[3]} \left[\begin{array}{ccc|c} 1 & -1 & -5 & -1 \\ -3 & 1 & 4 & 1 \\ 2 & 0 & 1 & -1 \end{array} \right]$$

$$\xrightarrow{\substack{[2]+3[1] \\ [3]-2[1]}} \left[\begin{array}{ccc|c} 1 & -1 & -5 & -1 \\ 0 & -2 & -11 & -2 \\ 0 & 2 & 11 & 1 \end{array} \right] \xrightarrow{[2]+[3]} \left[\begin{array}{ccc|c} 1 & -1 & -5 & -1 \\ 0 & 0 & 0 & -1 \\ 0 & 2 & 11 & 1 \end{array} \right]$$

$$\therefore 0x_1 + 0x_2 + 0x_3 = -1$$

$$0 = -1 \quad \text{---} \times$$

\(\therefore\) No solution!