22 Augmented matrix $[A|I] = \left[\begin{array}{ccc|ccc} 1 & 2 & -1 & 1 & 0 & 0 \\ 2 & 0 & 1 & 0 & 1 & 0 \\ 0 & 1 & -3 & 0 & 0 & 1 \end{array}\right]$

$R_2 - 2R_1 \longrightarrow R_2$

$-2R_1 = \left[\begin{array}{ccc|ccc} -2 & -4 & -2 & -2 & 0 & 0 \end{array}\right]$

$\left[\begin{array}{ccc|ccc} 1 & 2 & -1 & 1 & 0 & 0 \\ 0 & -4 & 3 & -2 & 1 & 0 \\ 0 & 1 & -3 & 0 & 0 & 1 \end{array}\right]$

$R_1 - 2R_3 \longrightarrow R_1$

$-2R_3 = \left[\begin{array}{ccc|ccc} 0 & -2 & 6 & 0 & 0 & -2 \end{array}\right]$

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

$4R_3 + R_2 \longrightarrow R_3$

$4R_3 = \left[\begin{array}{ccc|ccc} 0 & 4 & -12 & 0 & 0 & 4 \end{array}\right]$

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

$3R_2 + R_3 \longrightarrow R_2$

$3R_2 = \left[\begin{array}{ccc|ccc} 0 & -12 & 9 & -6 & 3 & 0 \end{array}\right]$

$\left[\begin{array}{ccc|ccc} 1 & 0 & 5 & 1 & 0 & -2 \\ 0 & -12 & 0 & -8 & 4 & 4 \\ 0 & 0 & -9 & -2 & 1 & 4 \end{array}\right]$

$9R_1 + 5R_3 \longrightarrow R_1$

$9R_1 = \left[\begin{array}{ccc|ccc} 9 & 0 & 45 & 9 & 0 & -18 \end{array}\right]$

$5R_3 = \left[\begin{array}{ccc|ccc} 0 & 0 & -45 & -10 & 5 & 20 \end{array}\right]$

$\left[\begin{array}{ccc|ccc} 9 & 0 & 0 & -1 & 5 & 2 \\ 0 & -12 & 0 & -8 & 4 & 4 \\ 0 & 0 & -9 & -2 & 1 & 4 \end{array}\right]$

$\frac{1}{9}R_1 \to R_1 \; ; \; \frac{1}{12}R_2 \to R_2 \; , \; -\frac{1}{9}R_3 \to R_3$

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

$A^{-1} = \begin{bmatrix} -\frac{1}{9} & \frac{5}{9} & \frac{2}{9} \\ \frac{2}{3} & -\frac{1}{3} & -\frac{1}{3} \\ \frac{2}{9} & -\frac{1}{9} & -\frac{4}{9} \end{bmatrix}$

$B = \begin{bmatrix} 2 \\ 5 \\ -7 \end{bmatrix}$

$X = A^{-1}B = \begin{bmatrix} -\frac{1}{9} & \frac{5}{9} & \frac{2}{9} \\ \frac{2}{3} & -\frac{1}{3} & -\frac{1}{3} \\ \frac{2}{9} & -\frac{1}{9} & -\frac{4}{9} \end{bmatrix} \begin{bmatrix} 2 \\ 5 \\ -7 \end{bmatrix}$

$$\boxed{X = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}}$$