

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

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

$$\left[\begin{array}{ccc|c} 2 & 0 & -1 & 4 \\ 0 & 1 & 0 & -4 \\ 0 & 0 & -3 & -4 \end{array} \right] \rightarrow \begin{array}{l} 2x - \frac{4}{3} = -4, \quad x_1 = -\frac{8}{3} \\ x_2 = y = -4 \\ -3z = -4, \quad z = \frac{4}{3} \\ x_3 \end{array}$$

$$x_1 = \frac{1}{2}$$

$$x_2 = 1$$

$$x_3 = \frac{3}{2}$$

$$\begin{bmatrix} 1 & 1 & 1 & | & 2 \\ 2 & 3 & 4 & | & 3 \\ 1 & -2 & -1 & | & 1 \end{bmatrix} \xrightarrow{\textcircled{1} - \textcircled{3}} \begin{bmatrix} 1 & 1 & 1 & | & 2 \\ 2 & 3 & 4 & | & 3 \\ 0 & 3 & 2 & | & 1 \end{bmatrix}$$

$$\xrightarrow{2\textcircled{1} - \textcircled{2}} \begin{bmatrix} 1 & 1 & 1 & | & 2 \\ 0 & -1 & -2 & | & 1 \\ 0 & 3 & 2 & | & 1 \end{bmatrix} \xrightarrow{3\textcircled{2} + \textcircled{3}}$$

$$\begin{bmatrix} 1 & 1 & 1 & | & 2 \\ 0 & -1 & -2 & | & 1 \\ 0 & 0 & -4 & | & 4 \end{bmatrix} \rightarrow \begin{aligned} &x + 1 - 1 = 2, \quad x = 2 \\ &-y - 2(-1) = 1, \quad y = 1 \\ &-4z = 4, \quad z = -1 \end{aligned}$$

$$\left[\begin{array}{ccc|c} 1 & -2 & -3 & -1 \\ 3 & 1 & 1 & 4 \\ 11 & -1 & -3 & 10 \end{array} \right]$$

$$a \begin{bmatrix} 1 \\ 3 \\ 11 \end{bmatrix} + b \begin{bmatrix} -2 \\ 1 \\ -1 \end{bmatrix} = \begin{bmatrix} -3 \\ 1 \\ -3 \end{bmatrix}$$

$$\Rightarrow \left[\begin{array}{ccc|c} 1 & -2 & -3 & -1 \\ 3 & 1 & 1 & 4 \\ 14 & 0 & -2 & 14 \end{array} \right]$$

$$\Rightarrow \left[\begin{array}{ccc|c} 7 & 0 & -1 & 7 \\ 3 & 1 & 1 & 4 \\ 14 & 0 & -2 & 14 \end{array} \right]$$

$$\Rightarrow \left[\begin{array}{ccc|c} & & & \\ & & & \\ 0 & 0 & 0 & 0 \end{array} \right]$$