

$$\begin{aligned} x + 2y - z &= 2 \\ 2x + z &= 5 \\ y - 3z &= -7 \end{aligned}$$

Augmented matrix

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

$$R_2 - 2R_1 \rightarrow R_2$$

$$-2R_1 = [-2 \ -4 \ 2 \ | \ -4]$$

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

$$R_1 - 2R_3 \rightarrow R_1$$

$$-2R_3 = [0 \ -2 \ 6 \ | \ 14]$$

$$\left[\begin{array}{ccc|c} 1 & 0 & 5 & 16 \\ 0 & -4 & 3 & 1 \\ 0 & 1 & -3 & -7 \end{array} \right]$$

$$4R_3 + R_2 \rightarrow R_2$$

$$4R_3 = [0 \ 4 \ -12 \ | \ -28]$$

$$\left[\begin{array}{ccc|c} 1 & 0 & 5 & 16 \\ 0 & -4 & 3 & 1 \\ 0 & 0 & -9 & -27 \end{array} \right]$$

$$3R_2 + R_3 \rightarrow R_2$$

$$3R_2 = [0 \ -12 \ 9 \ | \ 3]$$

$$\left[\begin{array}{ccc|c} 1 & 0 & 5 & 16 \\ 0 & -12 & 0 & -24 \\ 0 & 0 & -9 & -27 \end{array} \right]$$

$$9R_1 + 5R_3 \rightarrow R_1$$

$$9R_1 = [9 \ 0 \ 45 \ | \ 144]$$

$$5R_3 = [0 \ 0 \ -45 \ | \ -135]$$

$$\left[\begin{array}{ccc|c} 9 & 0 & 0 & 9 \\ 0 & -12 & 0 & -24 \\ 0 & 0 & -9 & -27 \end{array} \right]$$

$$\frac{1}{9}R_1 \rightarrow R_1, \quad -\frac{1}{12}R_2 \rightarrow R_2, \quad -\frac{1}{9}R_3 \rightarrow R_3$$

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

0
06

$$\begin{aligned} x &= 1 \\ y &= 2 \\ z &= 3 \end{aligned}$$