

5.2.17

Solve the system of equations.

$$\begin{aligned} 7x - y + z &= 6 & (1) \\ 2x + 2y - 3z &= -12 & (2) \\ x - 3y + 2z &= 18 & (3) \end{aligned}$$

$$\begin{array}{r} 5 \overline{) 18} \\ \underline{10} \\ 8 \\ 2 \overline{) 8} \\ \underline{4} \\ 4 \\ 2 \overline{) 4} \\ \underline{2} \\ 2 \end{array}$$

LCM = 2 · 2 · 2 · 5 = 40

$$\begin{bmatrix} 1 & -3 & 2 \\ 2 & 2 & -3 \\ 7 & -1 & 1 \end{bmatrix} \begin{bmatrix} 6 \\ -12 \\ 18 \end{bmatrix} = \begin{bmatrix} 18 \\ -12 \\ 6 \end{bmatrix} \checkmark$$

$$\begin{bmatrix} 18 \\ -12 \\ 6 \end{bmatrix}$$

$$\begin{aligned} E1 \quad x - 3y + 2z &= 18 & -2E1 \quad -2x + 6y - 4z &= -36 \\ E2 \quad 2x + 2y - 3z &= -12 & E2 \quad 2x + 2y - 3z &= -12 \\ E3 \quad 7x - y + z &= 6 & -2E1 + E2 \quad 8y - 7z &= -48 \end{aligned}$$

$$\begin{aligned} E1 \quad x - 3y + 2z &= 18 \\ E2 \quad 8y - 7z &= -48 \\ E3 \quad 20y - 13z &= -120 \end{aligned}$$

$$\begin{aligned} -5E2 \quad -40y + 35z &= 240 \\ 2E3 \quad 40y - 26z &= -240 \\ \hline -5E2 + E3 \quad 9z &= 0 \end{aligned}$$

$$z = 0$$

$$8y - 7(0) = -48$$

$$y = -6$$

$$x - 3(-6) + 2(0) = 18$$

$$x + 18 = 18$$

$$x = 0$$

$$\frac{48}{5} = \frac{40}{200}$$