

# DETAILED SOLUTION

$$\begin{cases} 2x - 2y + z = 3 \\ 3x + y - z = 7 \\ x - 3y + 2z = 0 \end{cases}$$

← NOT ONE OF THE PROBLEMS IN YOUR BOOK

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$$\left[ \begin{array}{ccc|c} 2 & -2 & 1 & 3 \\ 3 & 1 & -1 & 7 \\ 1 & -3 & 2 & 0 \end{array} \right] \begin{array}{l} R_1 \leftrightarrow R_3 \\ \end{array}$$

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$$\left[ \begin{array}{ccc|c} 1 & -3 & 2 & 0 \\ 3 & 1 & -1 & 7 \\ 2 & -2 & 1 & 3 \end{array} \right] \begin{array}{l} -3R_1 + R_2 \\ -2R_1 + R_3 \end{array}$$

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$$\left[ \begin{array}{ccc|c} 1 & -3 & 2 & 0 \\ 0 & 10 & -7 & 7 \\ 0 & 4 & -3 & 3 \end{array} \right] \begin{array}{l} \frac{1}{10}R_2 \end{array}$$

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$$\left[ \begin{array}{ccc|c} 1 & -3 & 2 & 0 \\ 0 & 1 & -\frac{7}{10} & \frac{7}{10} \\ 0 & 4 & -3 & 3 \end{array} \right] \begin{array}{l} -4R_2 + R_3 \end{array}$$

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$$\left[ \begin{array}{ccc|c} 1 & -3 & 2 & 0 \\ 0 & 1 & -\frac{7}{10} & \frac{7}{10} \\ 0 & 0 & -\frac{1}{5} & \frac{1}{5} \end{array} \right] \begin{array}{l} -5R_3 \end{array}$$

$$R_2 \quad R_3 \\ -4\left(-\frac{7}{10}\right) + (-3) = \frac{28}{10} - \frac{30}{10} = \frac{-2}{10} = \frac{-1}{5}$$

$$-4\left(\frac{7}{10}\right) + 3 = -\frac{28}{10} + \frac{30}{10} = \frac{2}{10} = \frac{1}{5}$$

$$\left[ \begin{array}{ccc|c} 1 & -3 & 2 & 0 \\ 0 & 1 & -\frac{7}{10} & \frac{7}{10} \\ 0 & 0 & 1 & -1 \end{array} \right] \quad \boxed{z = -1}$$

$$\begin{aligned} x - 3y + 2z &= 0 \\ x - 3(0) + 2(-1) &= 0 \\ x - 2 &= 0 \\ \boxed{x = 2} \end{aligned}$$

$\{(2, 0, -1)\}$

$$\begin{aligned} y - \frac{7}{10}z &= \frac{7}{10} \\ y - \frac{7}{10}(-1) &= \frac{7}{10} \\ y + \frac{7}{10} &= \frac{7}{10} \\ y &= \frac{7}{10} - \frac{7}{10} = 0 \\ \boxed{y = 0} \end{aligned}$$