

1) $x + y + z = 12$
 $6x - 2y - z = 16$
 $3x + 4y + 2z = 28$

2) $8x - 6z = 38$
 $2x - 5y + 3z = 5$
 $x + 10y - 4z = 8$

3) $5x - 4y - 7z = -40$
 $-4x - 4y - 4z = 8$
 $8x + 3y + 5z = -18$

4) $4x - 2y + 8z = 30$
 $x + 2y - 7z = -12$
 $2x - y + 4z = 15$

$$\begin{aligned} 1) \quad & x + y + z = 12 \\ & (6x - 2y - z = 16) \cdot 2 \\ & 3x + 4y + 2z = 28 \end{aligned}$$

$$\begin{aligned} & + \quad x + y + z = 12 \\ & \quad 6x - 2y - z = 16 \\ \hline & 7x - y = 28 \end{aligned}$$

$$\begin{aligned} & + \quad 12x - 4y - 2z = 32 \\ & \quad 3x + 4y + 2z = 28 \\ \hline & 15x = 60 \\ & \quad \boxed{x = 4} \end{aligned}$$

$$7(4) - y = 28$$

$$28 - y = 28$$

$$-y = 0$$

$$\boxed{y = 0}$$

$$4 + 0 + z = 12$$

$$4 + z = 12$$

$$\boxed{z = 8}$$

$$(4, 0, 8)$$

$$\begin{aligned} 2) \quad & 8x - 6z = 38 \\ & (2x - 5y + 3z = 5) \cdot 2 \\ & x + 10y - 4z = 8 \end{aligned}$$

$$\begin{aligned} & + \quad 4x - 10y + 6z = 10 \\ & \quad x + 10y - 4z = 8 \\ \hline & 5x + 2z = 18 \end{aligned}$$

$$\begin{aligned} & 8x - 6z = 38 \rightarrow 8x - 6z = 38 \\ & (5x + 2z = 18) \cdot 3 \quad + \quad 15x + 6z = 54 \\ \hline & 23x = 92 \end{aligned}$$

$$\boxed{x = 4}$$

$$5(4) + 2z = 18$$

$$20 + 2z = 18$$

$$2z = -2$$

$$\boxed{z = -1}$$

$$4 + 10y - 4(-1) = 8$$

$$10y + 8 = 8$$

$$10y = 0$$

$$\boxed{y = 0}$$

$$(4, 0, -1)$$

$$\begin{aligned} 3) \quad & 5x - 4y - 7z = -40 \\ & -4x - 4y - 4z = 8 \\ & 8x + 3y + 5z = -18 \end{aligned}$$

$$\begin{aligned} & 5x - 4y - 7z = -40 \\ & -4x - 4y - 4z = 8 \\ \hline & 9x - 3z = -48 \end{aligned}$$

$$\begin{aligned} & (-4x - 4y - 4z = 8) \cdot 3 \quad -12x - 12y - 12z = 24 \\ & (8x + 3y + 5z = -18) \cdot 4 \quad + \quad 32x + 12y + 20z = -72 \\ \hline & 20x + 8z = -48 \end{aligned}$$

$$(9x - 3z = -48) \cdot 8$$

$$(20x + 8z = -48) \cdot 3$$

$$\begin{aligned} & + \quad 72x - 24z = -384 \\ & \quad 60x + 24z = -144 \\ \hline & 132x = -528 \end{aligned}$$

$$132x = -528$$

$$\boxed{x = -4}$$

$$9(-4) - 3z = -48$$

$$-36 - 3z = -48$$

$$-3z = -12$$

$$\boxed{z = 4}$$

$$-4(-4) - 4y - 4(4) = 8$$

$$-4y = 8$$

$$\boxed{y = -2}$$

$$(-4, -2, 4)$$

$$\begin{aligned} 4) \quad & 4x - 2y + 8z = 30 \\ & x + 2y - 7z = -12 \\ & 2(2x - y + 4z = 15) \end{aligned}$$

$$\begin{aligned} & + \quad 4x - 2y + 8z = 30 \\ & \quad x + 2y - 7z = -12 \\ \hline & 5x + z = 18 \end{aligned}$$

$$\begin{aligned} & + \quad x + 2y - 7z = -12 \\ & \quad 4x - 2y + 8z = 30 \\ \hline & 5x + z = 18 \end{aligned}$$

$$5x + z = 18$$

$$- \quad 5x + z = 18$$

$$0 = 0$$

infinite solutions