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1) $4x_1 + 2x_2 = 20$
$2x + 8x_2 = 24$

$\begin{pmatrix} 4 & 2 & 20 \\ 2 & 8 & 24 \end{pmatrix} \rightarrow B_2 = 2B_2 - B_1 \begin{pmatrix} 4 & 2 & 20 \\ 0 & 14 & 28 \end{pmatrix}$

$\Rightarrow 14x_2 = 28$
$x_2 = 2$

$\Rightarrow 4x_1 + 2x_2 = 20$
$4x_1 + 2(2) = 20$
$4x_1 + 4 = 20$
$\therefore 4x_1 + 4 = 20$
$4x_1 = 16$
$x_1 = 4$

2) $2x_1 + x_2 = 10$
$2x + 8x_2 = 24$

$\begin{pmatrix} 2 & 1 & 10 \\ 2 & 8 & 24 \end{pmatrix} \rightarrow B_3 = B_2 - B_1 \begin{pmatrix} 2 & 1 & 10 \\ 0 & 7 & 14 \end{pmatrix}$

$\Rightarrow 7x_1 = 14$
$x_1 = 2$

$\Rightarrow 2x_1 + x_2 = 10$
$2x_1 + 2 = 10$
$2x_1 = 8$
$x_1 = 4$

3) $x - 4y + 4z = 3$
$2x + 9y + 2 = 13$
$-x + 3y + 2z = 1$

$\begin{pmatrix} 1 & -4 & -4 & 3 \\ 2 & 9 & 1 & 13 \\ -1 & 3 & 2 & 1 \end{pmatrix}$ $B_2 = B_2 + 2B_3$
$B_3 = B_3 + B_1$

$\sim \begin{pmatrix} 1 & -4 & -4 & 3 \\ 0 & 15 & 5 & 15 \\ 0 & -1 & -2 & -2 \end{pmatrix}$ $B_3 = 15B_3 + B_2$ $\begin{pmatrix} 1 & -4 & -4 & 3 \\ 0 & 15 & 5 & 15 \\ 0 & 0 & -25 & 15 \end{pmatrix}$

Talk less, do more.

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$-25z = -15$

$z = \frac{-15}{-25} = \frac{3}{5}$

$15y + 5z = 15$

$15y + 5\left(\frac{3}{5}\right) = 15$

$15y = 15$

$y = 1$

$x - 4y - 4z = 3$

$x - 4(1) - 4\left(\frac{3}{5}\right) = 3$

$x - 4 - \frac{12}{5} = 3$

$\frac{x - 20}{5} - \frac{12}{5} = 3$

$\frac{x - 32}{5} = 3$

$x = 3 + \frac{32}{5}$

$x = \frac{47}{5}$

4). $3x + 2y - 5z = 2$

$2x - y + 4z = 4$

$-5x + 3y - 2 = 0$

$$\left(\begin{array}{cccc} 3 & 2 & -5 & 2 \\ 2 & -1 & 4 & 4 \\ -5 & 3 & -1 & 0 \end{array}\right)$$

$B_2 = 3B_2 - 2B_1$

$B_3 = 3B_3 - 5B_1$

$$\left(\begin{array}{cccc} 3 & 2 & -5 & 2 \\ 0 & -7 & 22 & 8 \\ 0 & 19 & -28 & 10 \end{array}\right)$$

$B_3 = 7B_3 + 19B_3$

$$\left(\begin{array}{cccc} 3 & 2 & -5 & 2 \\ 0 & -7 & 22 & 8 \\ 0 & 0 & 222 & 232 \end{array}\right)$$

$222z = 222$

$z = 1$

Smile and the world smiles with you.

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$-7 - 7y + 22z = 8$

$-7y + 22(1) = 8$

$-7y + 22 = 8$

$-7y = -14$

$y = 2$

→ $3x + 2y - 5t = 2$

$3x + 2(2) - 5(1) = 2$

$3x + 4 - 5 = 2$

$3x - 1 = 2$

$3x = 3$

$x = 1$ //