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Question: 17. Solve the linear system by Gauss elimination. Show all inter...

17. Solve the linear system by **Gauss elimination**. Show all intermediate results.

$$\begin{aligned}x + y - z &= 9 \\8y + 6z &= -6 \\-2x + 4y - 6z &= 40\end{aligned}$$

20. Solve the linear system by **Cramer's rule**. Show all intermediate results.

$$\begin{aligned}3y - 4z &= 16 \\2x - 5y + 7z &= -27 \\-x - 9z &= 9\end{aligned}$$

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$$8y + 6z - 2x + 4y - 6z = 40$$

The augmented matrix is

$$\left[\begin{array}{ccc|c} 1 & 1 & -1 & 9 \\ 0 & 8 & 6 & -6 \\ -2 & 4 & -6 & 40 \end{array} \right]$$

$$R_3 \rightarrow R_3 + 2R_1$$

$$\left[\begin{array}{ccc|c} 1 & 1 & -1 & 9 \\ 0 & 8 & 6 & -6 \\ 0 & 6 & -8 & 58 \end{array} \right]$$

$$R_2 \rightarrow R_2 / 8$$

$$\left[\begin{array}{ccc|c} 1 & 1 & -1 & 9 \\ 0 & 1 & 6/8 & -6/8 \\ 0 & 6 & -8 & 58 \end{array} \right]$$

$$R_3 \rightarrow R_3 - 6R_2$$

$$\left[\begin{array}{ccc|c} 1 & 1 & -1 & 9 \\ 0 & 1 & 6/8 & -6/8 \\ 0 & 0 & -25/2 & 125/2 \end{array} \right]$$

From back substitution.

$$\Rightarrow \frac{-25}{2} z = \frac{125}{2}$$

$$\Rightarrow \boxed{z = -5}$$

$$y + \frac{6}{8}z = -\frac{6}{8}$$

$$\Rightarrow y = -\frac{6}{8} - \frac{6}{8}(-5)$$

$$= -\frac{6}{8} + \frac{30}{8} = \frac{24}{8} = 3$$

$$\Rightarrow \boxed{y = 3}$$

Also $x + y - z = 9$

$$x = 9 - y + z$$

$$= 9 - 3 - 5 = 1$$

$$\Rightarrow \boxed{x = 1}$$

$$\therefore \boxed{x = 1}, \boxed{y = 3}, \boxed{z = -5}$$



$$\begin{aligned} 2x - 5y + 7z &= -27 \\ -x - 9z &= 9 \end{aligned}$$

Augmented matrix is

$$\left[\begin{array}{ccc|c} 0 & 3 & -4 & 16 \\ 2 & -5 & 7 & -27 \\ -1 & 0 & -9 & 9 \end{array} \right]$$

Using cramer rule,

$$D = \begin{vmatrix} 0 & 3 & -4 \\ 2 & -5 & 7 \\ -1 & 0 & -9 \end{vmatrix}$$

$$= -2(-27 - 0) - 1(21 - 20)$$

$$= 54 - 1 = 53$$

$$D_x = \begin{vmatrix} 16 & 3 & -4 \\ -27 & -5 & 7 \\ 9 & 0 & -9 \end{vmatrix}$$

$$= 9(21 - 20) - 9(-80 + 81)$$



$$D_x = 0$$

$$D_y = \begin{vmatrix} 0 & 16 & -4 \\ 2 & -27 & 7 \\ -1 & 9 & -9 \end{vmatrix}$$

$$= -2(-144 + 36) - 1(112 - 108)$$

$$= -2(-108) - 1(4)$$

$$= 216 - 4 = 212$$

$$D_z = \begin{vmatrix} 0 & 3 & 16 \\ 2 & -5 & -27 \\ -1 & 0 & 9 \end{vmatrix}$$

$$= -2(27 - 0) - 1(-81 + 80)$$

$$= -54 - 1(-1) = -54 + 1 = -53$$

Hence $x = \frac{D_x}{D} = \frac{0}{53} = 0$

$$y = \frac{D_y}{D} = \frac{212}{53} = 4$$

$$z = \frac{D_z}{D} = \frac{-53}{53} = -1$$

$\therefore \boxed{x=0}, \boxed{y=4}, \boxed{z=-1}$.

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Q: 17. Solve the linear system by Gauss elimination. Show all intermediate results. $x + y - z = 9$
 $8y + 6z = -6 - 2x + 4y - 6z = 40$
 20 . Solve the linear system by Cramer's rule. Show all intermediate results. $3y - 4z = 16$
 $2x - 5y + 7z = -27$
 $-x - 9z = 9$

A: [See answer](#)

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Consider a linear system of the following three equations

Consider a linear system of the following three equations
 $x + y - z = 9$
 $8y + 6z = -6 - 2x + 4y - 6z = 40$
 20
 $2x - 5y + 7z = -27$
 $-x - 9z = 9$

16. The augmented matrix of this given system is *

$$\left[\begin{array}{ccc|c} 1 & 1 & -1 & 9 \\ 0 & 8 & 6 & -6 \\ 0 & -2 & 7 & -27 \\ 0 & -1 & -9 & 9 \end{array} \right]$$

[See answer](#)

If $n(A) = 25$, $n(B) = 24$, $n(C) = 23$, $n(A \cap B) = 7$, $n(A \cap C) = 10$, $n(B \cap C) = 6$, and $n(A \cup B \cup C) = 53$, find $n(A \cap B \cap C)$.

[See answer](#)

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2x1 + 3x2 3x1 + 2x2 x1 + 2x2 4. 2x1 + 5x2 3x1 + 4x2 + + + + 3x3 2x3 X3 2x3 3x3 5 5 16 5 2 = - 4x3 1 = 3x3 3 8x3 4 17x3
1 3x3 2x4 2 + 8x3 6x4 5 + 5x3 2x4 4 +

A: [See answer](#)

Q: Find the inverse by Gauss-Jordan elimination. Show all intermediate results -4 0 0 0 8 13 0 3 5

A: [See answer](#)

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