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ID 7697

Section A

Quiz No # 1

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$$x + 3y + 5z + 2t = 2$$
$$-y + 3z + 4t = 0$$
$$2x + y + 9z + 6t = -3$$
$$3x + 2y + 4z + 8t = -1$$

Solution:-

Using Guass Jorden Method

$$x + 3y + 5z + 2t = 2$$
$$-y + 3z + x = 0$$
$$2x + y + 9z + 6t = -3$$
$$3x + 2y + 4z + 8t = -1$$

writing in Matrix form system

$$2t + x + 3y + 5z = 2$$
$$x - y + 3z = 0$$
$$6t + 2x + y + 9z = -3$$
$$8t + 3x + 2y + 4z = -1$$

$$= \begin{vmatrix} 2 & 1 & 3 & 5 & 2 \\ 0 & 1 & -1 & 3 & 0 \\ -6 & 2 & 1 & 9 & -3 \\ 8 & 3 & 2 & 4 & -1 \end{vmatrix}$$

$$\sim \left[\begin{array}{cccc|c} 2 & 0 & 4 & 2 & 2 \\ 0 & 1 & -1 & 3 & 0 \\ 6 & 2 & 1 & 9 & 3 \\ 8 & 3 & 2 & 4 & -1 \end{array}\right]$$

Xing row 2 by -1 and add to row 1

$$\sim \left[\begin{array}{cccc|c} 2 & 0 & 4 & 2 & 2 \\ 0 & 1 & -1 & 3 & 0 \\ 6 & 0 & 3 & 3 & -3 \\ 8 & 3 & 2 & 4 & -1 \end{array}\right]$$

Xing row 2 by -2 and add it row 1

$$\sim \left[\begin{array}{cccc|c} 2 & 0 & 4 & 2 & 2 \\ 0 & 1 & -1 & 3 & 0 \\ 6 & 0 & 3 & 3 & -3 \\ 8 & 0 & 5 & -5 & -1 \end{array}\right]$$

Xing row 2 by -3 and add it row 4

$$\sim \left[\begin{array}{cccc|c} 1 & 0 & 2 & 1 & 1 \\ 0 & 1 & -1 & 3 & 0 \\ 6 & 0 & 3 & 3 & -3 \\ 8 & 0 & 5 & -3 & -1 \end{array}\right]$$

Divide the row by 2

$$\sim \left[\begin{array}{cccc|c} 1 & 0 & 2 & 1 & 1 \\ 0 & 1 & -1 & 3 & 0 \\ 2 & 0 & 1 & 1 & -1 \\ 8 & 0 & 5 & -5 & -1 \end{array}\right]$$

Divide the row 3 by 3

$$\sim \left[\begin{array}{cccc|c} 1 & 0 & 2 & 1 & 1 \\ 0 & 1 & -1 & 3 & 0 \\ 0 & 0 & -3 & -1 & -3 \\ 8 & 0 & 5 & -5 & -1 \end{array}\right]$$

Muti row by 2 and it to row 3

$$\left[\begin{array}{cccc|c} 1 & 0 & 2 & 1 & 1 \\ 0 & 1 & -1 & 3 & 0 \\ 0 & 0 & -3 & -1 & -3 \\ 0 & 0 & -11 & -13 & -9 \end{array}\right]$$ xing row 8 and add it to Row 4

$$= \left[\begin{array}{cccc|c} 1 & 0 & 2 & 1 & 1 \\ 0 & 1 & -1 & 3 & 0 \\ 0 & 0 & 3 & 1 & 3 \\ 0 & 0 & 11 & 13 & 9 \end{array}\right]$$ xing the row 3 by 1

$$= \left[\begin{array}{cccc|c} 1 & 0 & 2 & 1 & 1 \\ 0 & 1 & -1 & 3 & 0 \\ 0 & 0 & 3 & 1 & 3 \\ 0 & 0 & 11 & 13 & 9 \end{array}\right]$$ xing the row by -1

$$= \left[\begin{array}{cccc|c} 1 & 0 & -1 & 0 & -2 \\ 0 & 1 & -1 & 3 & 0 \\ 0 & 0 & 3 & 1 & 3 \\ 0 & 0 & 11 & 13 & 9 \end{array}\right]$$ xing row 3 by -1 and it to row

$$= \left[\begin{array}{cccc|c} 1 & 0 & -1 & 0 & -2 \\ 0 & 1 & -10 & 0 & -9 \\ 0 & 0 & 3 & 1 & 3 \\ 0 & 0 & -28 & 0 & -30 \end{array}\right]$$ xing row 3 by -13 and add it to row 4

$$= \left[\begin{array}{cccc|c} 1 & 0 & -1 & 0 & -2 \\ 0 & 1 & -10 & 0 & -9 \\ 0 & 0 & 3 & 1 & 3 \\ 0 & 0 & 1 & 0 & 15/14 \end{array}\right]$$ Divide row 4 by -28

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$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & -10 & 0 \\ 0 & 0 & 3 & 1 \\ 0 & 0 & 1 & 0 \end{bmatrix} \begin{matrix} -13/14 \\ -9 \\ 3 \\ 15/14 \end{matrix}$$ Add row 4 to row 1

$$= \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 3 & 1 \\ 0 & 0 & 1 & 0 \end{bmatrix} \begin{matrix} -13/14 \\ 12/7 \\ 3 \\ 15/14 \end{matrix}$$ xing row 4 by -10 and add it to row 2

$$= \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 \end{bmatrix}$$ xing row 4 by -3 and add it to row

Convert the augmented matrix into system of Linear equation

$t = -13/14$

$x = 12/7$

$z = 3/14$

$y = 15/14$

This possible solution of system is to the ordered -4 type

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$(t, x, y, z) = \left(-\frac{13}{14}, \frac{12}{7}, \frac{15}{14}, \frac{3}{14}\right)$

Check if the given order 4 type is solution of system of equation

$$\frac{12}{7} + 3x\frac{15}{14} + 5x\left(-\frac{3}{14}\right) + 2x\left(-\frac{13}{14}\right) = 2$$

$$-\frac{13}{14} + 3x\left(-\frac{3}{14}\right) + \frac{12}{7}$$

$$2x\frac{12}{7} + 2x\frac{15}{14} + 9x\left(-\frac{13}{14}\right) + 6x\left(-\frac{13}{14}\right) = 3$$

$$3x\frac{12}{7} + 2x\frac{15}{14} + 4x\left(-\frac{13}{14}\right) + 8x\left(-\frac{13}{14}\right) = -1$$

Simply the equation

$$2 = 2$$
$$0 = 0$$
$$-3 = -3$$
$$-1 = -1$$

Since all the equation are true so ordered 4 topic is the solution of system

$$(t, x, y, z)$$

$$= \left(-\frac{13}{14}, \frac{12}{7}, \frac{13}{14}, -\frac{3}{14}\right)$$

Ans