Taller Algebra Lineal

Nombre Erick Rodas

Fecha 02/06/2024

1) $-1x_1 \quad x_3 = 0$

$x_2 + 3x = 1$

$x_1 - x_2 = -3$

$$\Delta = \begin{vmatrix} -1 & 0 & 1 \\ 0 & 1 & 3 \\ 1 & -1 & 0 \end{vmatrix} = 0+0+0-1+3+0$$

$\Delta = -4$

$$\Delta x_1 = \begin{vmatrix} 0 & 0 & 1 \\ 1 & 1 & 3 \\ -3 & -1 & 0 \end{vmatrix} = \frac{0-1+0-(-3+0+0)}{-4}$$

$$= -\frac{2}{4}$$

$$x_1 = -\frac{1}{2}$$

$$\Delta x_2 = \begin{vmatrix} -1 & 0 & 1 \\ 0 & 1 & 3 \\ 1 & -3 & 0 \end{vmatrix} = \frac{0+0+0-(1+9+0)}{-4}$$

$$= \frac{-10}{-4}$$

$$\Delta x_2 = \frac{5}{2}$$

$$\Delta x_3 = \begin{vmatrix} -1 & 0 & 0 \\ 0 & 1 & 1 \\ 1 & -1 & 3 \end{vmatrix} = \frac{3+0+0-(0+1+0)}{-4}$$

$$= \frac{-2}{4}$$

$$\Delta x_3 = -\frac{1}{2}$$

b) $x_1 - 2x_2 + 3x = 0$

$4x_1 + x_2 - x_3 = 0$

$2x_1 - x_2 + 3x_3 = 0$

$$\begin{vmatrix} 1 & -2 & 3 \\ 4 & 1 & -1 \\ 2 & -1 & 3 \end{vmatrix}$$

$\Delta = 3 - 12 + 4 - (6 + 1 - 24)$

$- 5 - (-17)$

$\Delta = 12$

$$\Delta x_1 = \frac{\begin{vmatrix} 0 & -2 & 3 \\ 0 & 1 & -1 \\ 0 & -1 & 3 \end{vmatrix}}{12} = \frac{0}{12}$$

$\Delta x_1 = 0$ //

$$\Delta x_2 = \frac{\begin{vmatrix} 1 & 0 & 3 \\ 4 & 0 & -1 \\ 2 & 0 & 3 \end{vmatrix}}{12} = \frac{0}{12}$$

$\Delta x_2 = 0$ //

$$\Delta x_3 = \frac{\begin{vmatrix} 1 & -2 & 0 \\ 4 & 1 & 0 \\ 2 & -1 & 0 \end{vmatrix}}{24} = \frac{0}{12}$$

$x_3 = 0$ //

c) $-2x + x_2 + 6x_3 = 18$

$5x + 8x_3 = -16$

$3x + 2x_2 - 10x_3 = -3$

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

$\Delta = 0 + 60 + 24 - (0 - 32 - 50)$

$84 - (-82)$

$\Delta = 166$

$$\Delta x_1 = \frac{\begin{vmatrix} 18 & 1 & 6 \\ -16 & 0 & 8 \\ -3 & 2 & -10 \end{vmatrix}}{166} = 0 + 192 - 24 - (0 + 288 + 160)$$

$-216 - (448)$

$x_1 = \frac{-664}{166}$ $\quad x_1 = -4$ //

$$\Delta_{x2} = \begin{vmatrix} -2 & 18 & 6 \\ 5 & -6 & 8 \\ 3 & -3 & -6 \end{vmatrix} \begin{matrix} -2 & 18 \\ 5 & -6 \\ 3 & -3 \end{matrix} = -320 - 90 + 432 - (-288 + 48 - 900)$$

$$166$$

$$22 - (-1100)$$

$$x_2 = \frac{1162}{166}$$

$$x_2 = 7$$

$$\Delta_{x3} = \begin{vmatrix} -2 & 1 & 18 \\ 5 & 0 & -6 \\ 3 & 2 & -3 \end{vmatrix} \begin{matrix} -2 & 1 \\ 5 & 0 \\ 3 & 2 \end{matrix} = 0 + 180 - 48 - (0 + 64 - 15)$$

$$166$$

$$132 - (49)$$

$$x_3 = \frac{83}{166}$$

$$x_3 = \frac{1}{2}$$

d)
$$\begin{matrix} x + y + z = 1 \\ 2x + 3y - 4z = 9 \\ x - y + z = -1 \end{matrix}$$

$$\Delta = \begin{vmatrix} 1 & 1 & 1 \\ 2 & 3 & -4 \\ 1 & -1 & 1 \end{vmatrix} \begin{matrix} 1 & 1 \\ 2 & 3 \\ 1 & -1 \end{matrix} = 3 - 2 - 4(3 + 4 + 2)$$

$$-3 - (9)$$

$$-12$$

$$\Delta x = \begin{vmatrix} 1 & 1 & 1 \\ 9 & 3 & -4 \\ -1 & -1 & 1 \end{vmatrix} \begin{matrix} 1 & 1 \\ 9 & 3 \\ -1 & -1 \end{matrix} = 3 - 9 + 4 - (-3 + 4 + 9)$$

$$-12$$

$$-2 - (10)$$

$$\frac{-12}{-12}$$

$$x = 1$$

$$\Delta y = \begin{vmatrix} 1 & 1 & 1 \\ 2 & 9 & -4 \\ 1 & -1 & 1 \end{vmatrix} \begin{matrix} 1 & 1 \\ 2 & 9 \\ 1 & -1 \end{matrix} = 9 + 2 - 4 - (9 + 4 + 2)$$

$$3 - (15)$$

$$\frac{-12}{-12} \qquad y = 1$$

$$\Delta z = \begin{vmatrix} 1 & 1 & 1 \\ 2 & 3 & 9 \\ 1 & -1 & -1 \end{vmatrix} \quad -3 - 2 + 9 - (3 - 9 - 2)$$

$$-12 \qquad 4 - (-8)$$

$$\frac{12}{-12}$$

$$z = -1 \;//$$

e) $\quad 9x_2 - 7x_3 = 2$

$$-x_3 = -2$$

$$-3x_1 + 6x_2 + 8x_3 = 1$$

$$\left(\begin{array}{ccc|c} -3 & 6 & 8 & 1 \\ 0 & 9 & -7 & 2 \\ 0 & 0 & -1 & -2 \end{array}\right)$$

$$-x_3 = -2$$

$$x_3 = 2 \;//$$

$$9x_2 - 7x_3 = 2$$

$$9x_2 - 7(2) = 2$$

$$9x_2 = 2 + 14$$

$$x_2 = \frac{16}{9} \;//$$

$$-3x_1 + 6x_2 + 8x_3 = 1$$

$$-3x_1 + 6\left(\frac{16}{9}\right) + 8(2) = 1$$

$$-3x_1 = 1 - 16 - \frac{32}{3}$$

$$-9x_1 = 3 - 48 - 32$$

$$-9x_1 = -77$$

$$x_1 = \frac{77}{9} \;//$$