	UNIVERSIDAD MARIANO GALVEZ DE GUATEMALA CENTRO UNIVERSITARIO DE JALAPA **FACULTAD DE INGENIERIA**

Alumno/a: Esvin Giovanni González de la Cruz	**Carné: 0907-22-12653**

Asignatura:	Algebra Lineal	**Código:**	0907-007	**Semestre:**	Segundo
Ciclo:	Segundo			**Tarea 7**	
Catedrático:	Ing. M.A. Samuel de Jesús García				

Sistemas de Ecuaciones y Matrices Inversas

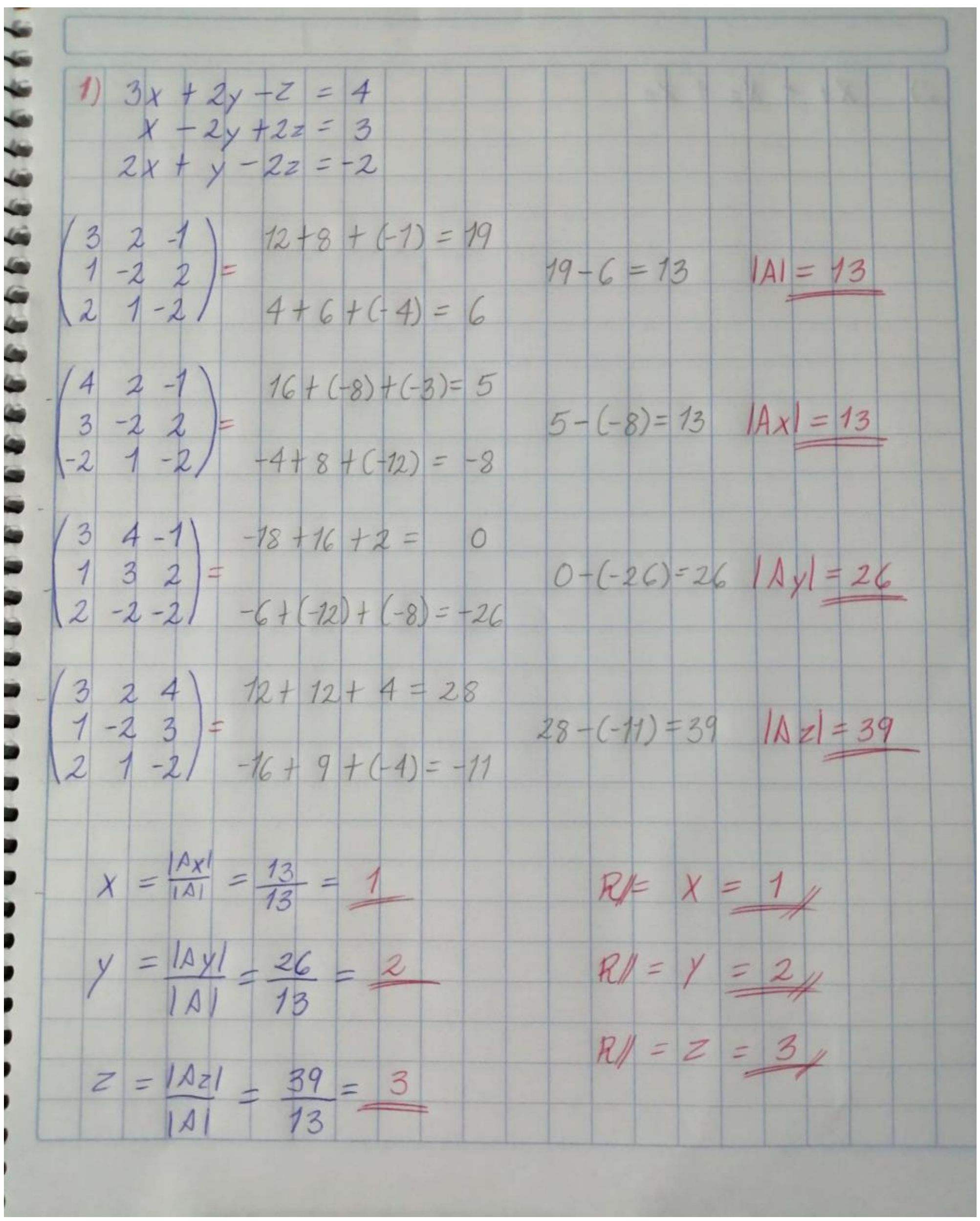
Resuelva por el método de CRAMER o determinantes los siguientes Sistemas de Ecuaciones:

1.

3x + 2y - z = 4

X – 2y + 2z = 3

2x + y -2z = -2



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

$\begin{pmatrix} 3 & 2 & -1 \\ 1 & -2 & 2 \\ 2 & 1 & -2 \end{pmatrix} =$ $12+8+(-1)=19$; $4+6+(-4)=6$; $19-6=13$; $|A| = 13$

$\begin{pmatrix} 4 & 2 & -1 \\ 3 & -2 & 2 \\ -2 & 1 & -2 \end{pmatrix} =$ $16+(-8)+(-3)=5$; $-4+8+(-12)=-8$; $5-(-8)=13$; $|Ax| = 13$

$\begin{pmatrix} 3 & 4 & -1 \\ 1 & 3 & 2 \\ 2 & -2 & -2 \end{pmatrix} =$ $-18+16+2=0$; $-6+(-12)+(-8)=-26$; $0-(-26)=26$; $|Ay| = 26$

$\begin{pmatrix} 3 & 2 & 4 \\ 1 & -2 & 3 \\ 2 & 1 & -2 \end{pmatrix} =$ $12+12+4=28$; $-16+9+(-4)=-11$; $28-(-11)=39$; $|Az| = 39$

$x = \frac{|Ax|}{|A|} = \frac{13}{13} = 1$

$y = \frac{|Ay|}{|A|} = \frac{26}{13} = 2$

$z = \frac{|Az|}{|A|} = \frac{39}{13} = 3$

R/ $x = 1$
R// $y = 2$
R// $z = 3$

2.

$x_1 + x_2 + x_3 = 6$

$-2x_1 + x_2 - x_3 = -5$

$-x_1 + 2x_2 - 2x_3 = -1$

2)

$$\begin{aligned} x_1 + x_2 + x_3 &= 6 \\ -2x_1 + x_2 - x_3 &= -5 \\ -x_1 + 2x_2 - 2x_3 &= -1 \end{aligned}$$

$\begin{pmatrix} 1 & 1 & 1 \\ -2 & 1 & -1 \\ -1 & 2 & -2 \end{pmatrix} =$ $-2 + 1 + (-4) = -5$; $-1 + (-2) + 4 = 1$; $-5 - 1 = -6$; $|\Delta| = -6$

$\begin{pmatrix} 6 & 1 & 1 \\ -5 & 1 & -1 \\ -1 & 2 & -2 \end{pmatrix} =$ $-12 + 1 + (-10) = -21$; $-1 + (-12) + 10 = -3$; $-21 - (-3) = -18$; $|\Delta x_1| = -18$

$\begin{pmatrix} 1 & 6 & 1 \\ -2 & -5 & -1 \\ -1 & -1 & -2 \end{pmatrix} =$ $10 + 6 + 2 = 18$; $5 + 1 + 24 = 30$; $18 - 30 = -12$; $|\Delta x_2| = -12$

$\begin{pmatrix} 1 & 1 & 6 \\ -2 & 1 & -5 \\ -1 & 2 & -1 \end{pmatrix} =$ $-1 + 5 + (-24) = -20$; $-6 + (-10) + 2 = -14$; $-20 - (-14) = -6$; $|\Delta x_3| = -6$

$X_1 = \dfrac{|\Delta x_1|}{|\Delta|} = \dfrac{-18}{-6} = 3$ R// $= X_1 = 3$ //

$X_2 = \dfrac{|\Delta x_2|}{|\Delta|} = \dfrac{-12}{-6} = 2$ R// $= X_2 = 2$ //

$X_3 = \dfrac{|\Delta x_3|}{|\Delta|} = \dfrac{-6}{-6} = 1$ // R// $= X_3 = 1$ //

Sean las matrices: $A=\begin{bmatrix}2 & -4 & 1\\ -1 & -3 & 2\\ 3 & 1 & -3\end{bmatrix}$, $B=\begin{bmatrix}-2 & 2 & 1\\ 2 & 3 & -2\\ 3 & 1 & -4\end{bmatrix}$, $C=\begin{bmatrix}-5 & 2 & -1\\ 3 & -2 & 1\\ -4 & 2 & 3\end{bmatrix}$

Resuelva:

3. A^{-1} por el método de adjunta o cofactores

$$A=\begin{pmatrix}2 & -4 & 1\\ -1 & -3 & 2\\ 3 & 1 & -3\end{pmatrix}= \quad 18+(-24)+(-1)=-7 \qquad -9+4+(-12)=-17$$

$$-7-(-17)=10 \qquad |A|=10$$

$$\begin{pmatrix}2 & -4 & 1\\ -1 & -3 & 2\\ 3 & 1 & -3\end{pmatrix}= \begin{array}{lll} 9-2=7 & 3-6=-3 & -1-(-9)=8\\ 12-1=11 & -6-3=-9 & 2-(-12)=14\\ -8-(3)=-5 & 4-(-1)=5 & -6-4=-10\end{array}$$

$$\begin{pmatrix}7 & -3 & 8\\ 11 & -9 & 14\\ -5 & 5 & -10\end{pmatrix}=\begin{pmatrix}7 & 3 & 8\\ -11 & -9 & -14\\ -5 & -5 & -10\end{pmatrix}=\begin{pmatrix}7 & -11 & -5\\ 3 & -9 & -5\\ 8 & -14 & -10\end{pmatrix}$$

$$A=\frac{1}{10}\begin{pmatrix}7 & -11 & -5\\ 3 & -9 & -5\\ 8 & -14 & -10\end{pmatrix}$$

$$A^{-1}=\frac{1}{10}\begin{pmatrix}7 & -11 & -5\\ 3 & -9 & -5\\ 8 & -14 & -10\end{pmatrix}=\begin{pmatrix}7/10 & -11/10 & -1/2\\ 3/10 & -9/10 & -1/2\\ 4/5 & -7/5 & -1\end{pmatrix}$$

$$R// \begin{pmatrix}7/10 & -11/10 & -1/2\\ 3/10 & -9/10 & -1/2\\ 4/5 & -7/5 & -1\end{pmatrix}$$

4. B^{-1} por el método de adjunta o cofactores

$$B = \begin{pmatrix} -2 & 2 & 1 \\ 2 & 3 & -2 \\ 3 & 1 & -4 \end{pmatrix} = \begin{matrix} 24 + (-12) + 2 = 14 \\ 9 + 4 + (-16) = -3 \end{matrix} \quad 14 - (-3) = 17 \quad |B| = 17$$

$$\begin{pmatrix} -2 & 2 & 1 \\ 2 & 3 & -2 \\ 3 & 1 & -4 \end{pmatrix} = \begin{matrix} -12 - (-2) = -10 & -8 - (-6) = -2 & 2 - 9 = -7 \\ -8 - 1 = -9 & 8 - 3 = 5 & -2 - 6 = -8 \\ -4 - 3 = -7 & 4 - 2 = 2 & -6 - 4 = -10 \end{matrix}$$

$$\begin{pmatrix} -10 & -2 & -7 \\ -9 & 5 & -8 \\ -7 & 2 & -10 \end{pmatrix} = \begin{pmatrix} -10 & 2 & -7 \\ 9 & 5 & 8 \\ -7 & -2 & -10 \end{pmatrix} = \begin{pmatrix} -10 & 9 & -7 \\ 2 & 5 & -2 \\ -7 & 8 & -10 \end{pmatrix}$$

$$B = \frac{1}{17} \begin{pmatrix} -10 & 9 & -7 \\ 2 & 5 & -2 \\ -7 & 8 & -10 \end{pmatrix}$$

$$B^{-1} = \frac{1}{17} \begin{pmatrix} -10 & 9 & -7 \\ 2 & 5 & -2 \\ -7 & 8 & -10 \end{pmatrix} = \begin{pmatrix} -10/17 & 9/17 & -7/17 \\ 2/17 & 5/17 & -2/17 \\ -7/17 & 8/17 & -10/17 \end{pmatrix}$$

R//
$$\begin{pmatrix} -10/17 & 9/17 & -7/17 \\ 2/17 & 5/17 & -2/17 \\ -7/17 & 8/17 & -10/17 \end{pmatrix}$$

5. C^{-1} por el método de adjunta o cofactores

$$C = \begin{pmatrix} -5 & 2 & -1 \\ 3 & -2 & 1 \\ -4 & 2 & 3 \end{pmatrix} = \begin{matrix} 30 + (-8) + (-6) = 16 \\ \\ -8 + (-10) + 18 = 0 \end{matrix}$$

$$16 - 0 = 16 \quad |C| = 16$$

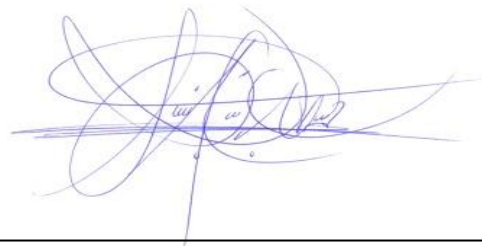
$$\begin{pmatrix} -5 & 2 & -1 \\ 3 & -2 & 1 \\ -4 & 2 & 3 \end{pmatrix} = \begin{matrix} -6-2=-8 & 9-(-4)=13 & 6-8=-2 \\ 6-(-2)=8 & -15-4=-19 & -10-(-8)=-2 \\ 2-2=0 & -5-(-3)=-2 & 10-6=4 \end{matrix}$$

$$\begin{pmatrix} -8 & 13 & -2 \\ 8 & -19 & -2 \\ 0 & -2 & 4 \end{pmatrix} = \begin{pmatrix} -8 & -13 & -2 \\ -8 & -19 & 2 \\ 0 & 2 & 4 \end{pmatrix} = \begin{pmatrix} -8 & -8 & 0 \\ -13 & -19 & 2 \\ -2 & 2 & 4 \end{pmatrix}$$

$$C = \frac{1}{16}\begin{pmatrix} -8 & -8 & 0 \\ -13 & -19 & 2 \\ -2 & 2 & 4 \end{pmatrix}$$

$$C^{-1} = \frac{1}{16}\begin{pmatrix} -8 & -8 & 0 \\ -13 & -19 & 2 \\ -2 & 2 & 4 \end{pmatrix} = \begin{pmatrix} -1/2 & -1/2 & 0 \\ -13/16 & -19/16 & 1/8 \\ -1/8 & 1/8 & 1/4 \end{pmatrix}$$

$$R// \begin{pmatrix} -1/2 & -1/2 & 0 \\ -13/16 & -19/16 & 1/8 \\ -1/8 & 1/8 & 1/4 \end{pmatrix}$$



Ing. M.A. Samuel de Jesús García
Docente de Algebra Lineal