· SISTEMAS DE ECUACIONES

23) A)

$$\left[\begin{array}{cc|c} -3 & -1 & 1 \\ 1 & 2 & 3 \end{array}\right] \Rightarrow \left[\begin{array}{cc|c} 1 & 2 & 3 \\ -3 & -1 & 1 \end{array}\right] \Rightarrow \left[\begin{array}{cc|c} 1 & 2 & 3 \\ 0 & 5 & 10 \end{array}\right] \Rightarrow \left[\begin{array}{cc|c} 1 & 2 & 3 \\ 0 & 1 & 2 \end{array}\right] \Rightarrow x+2y=3 \Rightarrow x+4=3 \Rightarrow x=-1$$

F1→F2   F1 · 3 + F2   F2 · 1/5

$y=2$ $x=-1$

BIEN ✓ $\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -1 \\ 2 \end{bmatrix}$ $S=\{-1;2\}$ S.C.D.

B)

$$\left[\begin{array}{cc|c} -1/2 & 2/3 & -1/4 \\ 3 & -4 & 3/2 \end{array}\right] \Rightarrow \left[\begin{array}{cc|c} 1 & -4/3 & 1/2 \\ 3 & -4 & 3/2 \end{array}\right] \Rightarrow \left[\begin{array}{cc|c} 1 & -4/3 & 1/2 \\ 0 & 0 & 0 \end{array}\right] \Rightarrow x - 4/3y = 1/2 \Rightarrow x = 4/3\,y + 1/2 \quad \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 4/3t + 1/2 \\ t \end{bmatrix}$$

$0=0$

F1 · -2   F1 · (-3) + F2

MAL X → AL FINAL ESTABA BIEN
DEJABA ARREGLADO EL
EJERCICIO DEL
CUADERNILLO

S.C.I.

c)

$$\left[\begin{array}{cc|c} 1 & -1/3 & 2 \\ 3 & -1 & -1 \end{array}\right] \Rightarrow \left[\begin{array}{cc|c} 1 & -1/3 & 2 \\ 0 & 0 & -7 \end{array}\right] \Rightarrow \begin{array}{l} x - 1/3y = 2 \\ 0x + 0y = -7 = \nexists \end{array}$$

F1 · (-3) + F2

S.I. $\begin{bmatrix} x \\ y \end{bmatrix} = \nexists$ BIEN ✓

d)

$$\left[\begin{array}{ccc|c} 3 & -4 & 1 & 4 \\ 2 & 1 & -5 & 8 \\ 1 & 2 & 3 & 14 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 2 & 3 & 14 \\ 2 & 1 & -5 & 8 \\ 3 & -4 & 1 & 4 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 2 & 3 & 14 \\ 0 & -3 & -11 & -20 \\ 0 & -10 & -8 & -38 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 2 & 3 & 14 \\ 0 & 1 & 11/3 & 20/3 \\ 0 & -10 & -8 & -38 \end{array}\right] \Rightarrow$$

F1→F3   F1 · (-2) + F2, F1 · (-3) + F3   F2 · -1/3   F2 · 10 + F3

$$\left[\begin{array}{ccc|c} 1 & 2 & 3 & 14 \\ 0 & 1 & 11/3 & 20/3 \\ 0 & 0 & 86/3 & 86/3 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 2 & 3 & 14 \\ 0 & 1 & 11/3 & 20/3 \\ 0 & 0 & 1 & 1 \end{array}\right] \Rightarrow \begin{array}{l} x+2y+3z=14 \Rightarrow x+6+3=14 \Rightarrow x+9=14 \Rightarrow x=5 \\ y+11/3\,z = 20/3 \Rightarrow y + 11/3 = 20/3 \Rightarrow y=3 \\ z=1 \end{array}$$

F3 · 3/86

BIEN ✓ $\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 5 \\ 3 \\ 1 \end{bmatrix}$ S.C.D.

e)

$$\left[\begin{array}{ccc|c} 4 & 1 & -5 & 10 \\ 1 & -2 & 1 & 1 \\ 5 & -1 & -4 & 11 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & -2 & 1 & 1 \\ 4 & 1 & -5 & 10 \\ 5 & -1 & -4 & 11 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & -2 & 1 & 1 \\ 0 & 9 & -9 & 6 \\ 0 & 9 & -9 & 6 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & -2 & 1 & 1 \\ 0 & 1 & -1 & 2/3 \\ 0 & 9 & -9 & 6 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & -2 & 1 & 1 \\ 0 & 1 & -1 & 2/3 \\ 0 & 0 & 0 & 0 \end{array}\right]$$

F1→F2   F1 · (-4) + F2, F1 · (-5) + F3   F2 · 1/9   F2 · (-9) + F3

$x - 2y + z = 1 \Rightarrow x = +2y - z + 1 \Rightarrow x = 2z + 4/3 - z + 1 \Rightarrow x = z + 7/3$

$y - z = 2/3 \Rightarrow y = z + 2/3$

$0=0$

S.C.I. $\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} t + 7/3 \\ t + 2/3 \\ t \end{bmatrix}$ BIEN ✓

f)

$$\left[\begin{array}{ccc|c} 4 & 1 & 3 & 0 \\ -2 & 0 & -2 & -2 \\ 4 & 3 & 1 & 1 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 1/4 & 3/4 & 0 \\ -2 & 0 & -2 & -2 \\ 4 & 3 & 1 & 1 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 1/4 & 3/4 & 0 \\ 0 & 1/2 & -1/2 & -2 \\ 0 & 2 & -2 & 1 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 1/4 & 3/4 & 0 \\ 0 & 1 & -1 & -4 \\ 0 & 2 & -2 & 1 \end{array}\right]$$

F1 · 1/4   F1 · 2 + F2, F1 · (-4) + F3   F2 · 2   F2 · (-2) + F3

$$\Downarrow \quad \left[\begin{array}{ccc|c} 1 & 1/4 & 3/4 & 0 \\ 0 & 1 & -1 & -4 \\ 0 & 0 & 0 & 9 \end{array}\right]$$

$u + 1/4x + 3/4t = 0$

$x - t = -4$

$0u + 0x + 0t = 9 = \nexists$

BIEN ✓ $\begin{bmatrix} u \\ x \\ t \end{bmatrix} = \nexists$ S.I.

G) $\left[\begin{array}{ccc|c} 1 & 1 & 1 & 6 \\ 1 & -1 & -1 & -4 \\ 3 & 1 & 1 & 8 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 1 & 1 & 6 \\ 0 & -2 & -2 & -10 \\ 0 & -2 & -2 & -10 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 1 & 1 & 6 \\ 0 & 1 & 1 & 5 \\ 0 & -2 & -2 & -10 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 1 & 1 & 6 \\ 0 & 1 & 1 & 5 \\ 0 & 0 & 0 & 0 \end{array}\right] \Rightarrow$

$x+y+z=6$
$y+z=5$
$0=0$

F1.(-1)+F2   F2. -1/2   F2.(2)+F3
F1.(-3)+F3

$y = 5 - z$

BIEN ✓

$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ 5-t \\ t \end{bmatrix}$ S.C.I.

$\boxed{x=1} \Leftarrow x = -5 + z - z + 6 \Leftarrow x = -y - z + 6$

H) $\left[\begin{array}{cccc|c} 2 & 3 & 2 & 4 & 4 \\ 4 & 10 & -4 & 0 & -8 \\ -3 & -2 & -5 & -2 & -4 \\ -2 & 4 & 4 & -7 & -1 \end{array}\right] \Rightarrow \left[\begin{array}{cccc|c} 1 & 3/2 & 1 & 2 & 2 \\ 4 & 10 & -4 & 0 & -8 \\ -3 & -2 & -5 & -2 & -4 \\ -2 & 4 & 4 & -7 & -1 \end{array}\right] \Rightarrow \left[\begin{array}{cccc|c} 1 & 3/2 & 1 & 2 & 2 \\ 0 & 4 & -8 & -8 & -16 \\ 0 & 5/2 & -2 & 4 & 2 \\ 0 & 7 & 6 & -3 & 3 \end{array}\right] \Rightarrow \left[\begin{array}{cccc|c} 1 & 3/2 & 1 & 2 & 2 \\ 0 & 1 & -2 & -2 & -4 \\ 0 & 5/2 & -2 & 4 & 2 \\ 0 & 7 & 6 & -3 & 5 \end{array}\right]$

F1. 1/2   F1.(-4)+F2   F2. 1/4   F2. -5/2 +F3
F1. 3+F3   F2.(-7)+F4
F1. 2+F4

$\left[\begin{array}{cccc|c} 1 & 3/2 & 1 & 2 & 2 \\ 0 & 1 & -2 & -2 & -16 \\ 0 & 0 & -3 & 9 & 12 \\ 0 & 0 & -8 & -17 & 117 \end{array}\right] \Rightarrow \left[\begin{array}{cccc|c} 1 & 3/2 & 1 & 2 & 2 \\ 0 & 1 & -2 & -2 & -16 \\ 0 & 0 & 1 & -8/7 & 11/7 \\ 0 & 0 & 0 & -17 & 117 \end{array}\right] \Rightarrow \left[\begin{array}{cccc|c} 1 & 3/2 & 1 & 2 & 2 \\ 0 & 1 & -2 & -2 & -16 \\ 0 & 0 & 1 & -8/7 & 11/7 \\ 0 & 0 & 0 & 1 & -117/17 \end{array}\right]$ MAL

F3. -5/4   F4. -1/17

↑ SE ME HIZO POR QUÉ EMPEZARON A HABER MUCHOS ERRORES

h) $\left[\begin{array}{cccc|c} 2 & 3 & 2 & 4 & 4 \\ 4 & 10 & -4 & 0 & -8 \\ -3 & -2 & -5 & -2 & -4 \\ -2 & 4 & 4 & -7 & -1 \end{array}\right] \Rightarrow \left[\begin{array}{cccc|c} 1 & 3/2 & 1 & 2 & 2 \\ 4 & 10 & -4 & 0 & -8 \\ -3 & -2 & -5 & -2 & -4 \\ -2 & 4 & 4 & -7 & -1 \end{array}\right] \Rightarrow \left[\begin{array}{cccc|c} 1 & 3/2 & 1 & 2 & 2 \\ 0 & 4 & -8 & -8 & -16 \\ 0 & 5/2 & -2 & 4 & 2 \\ 0 & 7 & 6 & -3 & 3 \end{array}\right] \Rightarrow \left[\begin{array}{cccc|c} 1 & 3/2 & 1 & 2 & 2 \\ 0 & 1 & -2 & -2 & -4 \\ 0 & 5/2 & -2 & 4 & 2 \\ 0 & 7 & 6 & -3 & 3 \end{array}\right]$

F1. 1/2   F1.(-4)+F2   F1. 2+F4   F2. 1/4   F2.(-5/2)+F3
F1. 3+F3   F2.(-7)+F4

$\left[\begin{array}{cccc|c} 1 & 3/2 & 1 & 2 & 2 \\ 0 & 1 & -2 & -2 & -4 \\ 0 & 0 & 3 & 9 & 12 \\ 0 & 0 & 20 & 11 & 31 \end{array}\right] \Rightarrow \left[\begin{array}{cccc|c} 1 & 3/2 & 1 & 2 & 2 \\ 0 & 1 & -2 & -2 & -4 \\ 0 & 0 & 1 & 3 & 4 \\ 0 & 0 & 20 & 11 & 31 \end{array}\right] \Rightarrow \left[\begin{array}{cccc|c} 1 & 3/2 & 1 & 2 & 2 \\ 0 & 1 & -2 & -2 & -4 \\ 0 & 0 & 1 & 3 & 4 \\ 0 & 0 & 0 & -49 & -49 \end{array}\right] \Rightarrow \left[\begin{array}{cccc|c} 1 & 3/2 & 1 & 2 & 2 \\ 0 & 1 & -2 & -2 & -4 \\ 0 & 0 & 1 & 3 & 4 \\ 0 & 0 & 0 & 1 & 1 \end{array}\right] \Rightarrow$

F3. 1/3   F3. -20+F4   F4. -1/49

$x + 3/2y + z + 2w = 2 \Rightarrow x + 3/2 \cdot 0 + 1 + 2 = 2 \Rightarrow x = 2 - 3 = -1$

$y - 2z - 2w = -4 \Rightarrow y - 2 - 2 = -4 \Rightarrow y = -4 + 4 = 0$

$z + 3w = 4 \Rightarrow z + 3 = 4 \Rightarrow z = 4 - 3 = 1$

$w = 1$

$\begin{bmatrix} x \\ y \\ z \\ w \end{bmatrix} = \begin{bmatrix} -1 \\ 0 \\ 1 \\ 1 \end{bmatrix}$ S.C.D. BIEN ✓

24) a) $x = 2y + 1/2z \Rightarrow x - 2y - 1/2z = 0$

$y + z = x + 1 \Rightarrow -x + y + z = 1$

$x + z - y = 5$ FALTA DE ATENCIÓN

$\left[\begin{array}{ccc|c} 1 & -2 & -1/2 & 0 \\ -1 & 1 & 1 & 1 \\ 1 & 1 & -1 & 5 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & -2 & -1/2 & 0 \\ 0 & -1 & 1/2 & 1 \\ 0 & 3 & -1/2 & 5 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & -2 & -1/2 & 0 \\ 0 & 1 & -1/2 & -1 \\ 0 & 3 & -1/2 & 5 \end{array}\right] \Rightarrow$

LOS SIGNOS VAN AL REVÉS

F1. 1+F2   F2.(-1)   F2.(-3)+F3
F1.(-1)+F3

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

~~F3 = 1~~

MAL X

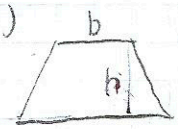
$$\begin{cases} x - 2y - 1/2 z = 0 \\ y - 1/2 z = -1 \\ z = +8 \end{cases} \Rightarrow$$

$y - 4 = -1 \Rightarrow y = 3$

$x - 6 - 4 = 0 \Rightarrow x = 10$

$$\begin{bmatrix} z \\ y \\ x \end{bmatrix} = \begin{bmatrix} 8 \\ 3 \\ 10 \end{bmatrix}$$ S.C.D.

b)



$2h = 3b \Rightarrow -3b + 2h = 0$

$b + B + h = 9$

$2b + 3B - h = 13$

$$\left[\begin{array}{ccc|c} -3 & 0 & 2 & 0 \\ 1 & 1 & 1 & 9 \\ 2 & 3 & -1 & 13 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 1 & 1 & 9 \\ -3 & 0 & 2 & 0 \\ 2 & 3 & -1 & 13 \end{array}\right] \Rightarrow$$

F1 → F2

F1. 3 + F2

F1. (−2) + F3

$$\left[\begin{array}{ccc|c} 1 & 1 & 1 & 9 \\ 0 & 3 & 5 & 27 \\ 0 & 1 & -3 & -5 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 1 & 1 & 9 \\ 0 & 1 & -3 & -5 \\ 0 & 3 & 5 & 27 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 1 & 1 & 9 \\ 0 & 1 & -3 & -5 \\ 0 & 0 & 14 & 42 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 1 & 1 & 9 \\ 0 & 1 & -3 & -5 \\ 0 & 0 & 1 & 3 \end{array}\right] \Rightarrow$$

F2 → F3

F2. (−3) + F3

F3. 1/14

$x + y + z = 9$

$y - 3z = -5$

$z = 3$

$y - 9 = -5 \Rightarrow y = -5 + 9 \Rightarrow y = 4$

$x + 4 + 3 = 9 \Rightarrow x = 9 - 7 \Rightarrow x = 2$

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 2 \\ 4 \\ 3 \end{bmatrix}$$ BIEN ✓

25)

a) $$\begin{bmatrix} 2 & -5 \\ -3 & 4 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 7 \\ -19 \end{bmatrix} \Rightarrow \left[\begin{array}{cc|c} 2 & -5 & 7 \\ -3 & 4 & -19 \end{array}\right] \Rightarrow \left[\begin{array}{cc|c} 1 & -5/2 & 7/2 \\ -3 & 4 & -19 \end{array}\right] \Rightarrow \left[\begin{array}{cc|c} 1 & -5/2 & 7/2 \\ 0 & -7/2 & -7/2 \end{array}\right] \Rightarrow \left[\begin{array}{cc|c} 1 & -5/2 & 7/2 \\ 0 & 1 & 1 \end{array}\right]$$

F1. 1/2

F1. 3 + F2

F2. −2/7

$x - 5/2 y = 7/2 \Rightarrow x - 5/2 = 7/2 \Rightarrow x = 7/2 + 5/2 \Rightarrow x = 6$

$y = 1$

$$\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 6 \\ 1 \end{bmatrix}$$ BIEN ✓ S.C.D.

b)

$$\left[\begin{array}{ccc|c} 1 & 0 & 2 & 4 \\ 2 & -1 & 0 & -6 \\ 0 & 3 & 4 & 0 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 0 & 2 & 4 \\ 0 & -1 & -4 & -16 \\ 0 & 3 & 4 & 0 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 0 & 2 & 4 \\ 0 & 1 & 4 & 16 \\ 0 & 3 & 4 & 0 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 0 & 2 & 4 \\ 0 & 1 & 4 & 16 \\ 0 & 0 & -8 & -48 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 0 & 2 & 4 \\ 0 & 1 & 4 & 16 \\ 0 & 0 & 1 & 6 \end{array}\right]$$

F1. (−2) + F2

F2. (−1)

F2. (−3) + F3

F3. −1/8

$x + 2z = 4 \Rightarrow x + 12 = 4 \Rightarrow x = -8$

$y + 4z = 16 \Rightarrow y + 24 = 16 \Rightarrow y = -8$

$z = 6$

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} -8 \\ -8 \\ 6 \end{bmatrix}$$ S.C.D. BIEN ✓

c)

$$\left[\begin{array}{ccc|c} 1 & 1 & -1 & 2 \\ 0 & 1 & -1 & 0 \\ 3 & 1 & 0 & 7 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 1 & -1 & 2 \\ 0 & 1 & -1 & 0 \\ 0 & -2 & 3 & 1 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 1 & -1 & 2 \\ 0 & 1 & -1 & 0 \\ 0 & 0 & 1 & 1 \end{array}\right] \Rightarrow$$

F1. (−3) + F3

F2. 2 + F3

$x + y - z = 2 \quad x = 2$

$y - z = 0 \Rightarrow y = 1$

$z = 1$

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 2 \\ 1 \\ 1 \end{bmatrix}$$ S.C.D.

BIEN ✓

d 26)

a) I) $$\begin{bmatrix} 50 & 60 & 75 \\ 50 & 65 & 40 \\ 70 & 55 & 50 \end{bmatrix} \begin{bmatrix} 10.775.000 \\ 8.675.000 \\ 10.175.000 \end{bmatrix} \quad \begin{bmatrix} 60 & 50 & 75 \\ 20 & 65 & 40 \\ 70 & 55 & 50 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 10.775.000 \\ 8.675.000 \\ 10.175.000 \end{bmatrix}$$ MAL

MAL MIRE POR DAR 215.500

PROBAR, ARREGLO Y MARCAR PRINCIPIO

$$\left[\begin{array}{ccc|c} 50 & 30 & 75 & 10.775.000 \\ 30 & 65 & 40 & 8.675.000 \\ 70 & 55 & 30 & 10.175.000 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 3/5 & 3/2 & 55.500 \\ 30 & 65 & 40 & 8.675.000 \\ 70 & 55 & 30 & 10.175.000 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 3/5 & 3/2 & 55.500 \\ 0 & 47 & -5 & 7.610.000 \\ 0 & 13 & -75 & 7.690.000 \end{array}\right]$$

F1. 1/50 — F1.(-30)+F2, F1.(-70)+F3 — F2. 1/47

$$\left[\begin{array}{ccc|c} 1 & 3/5 & 3/2 & 55.500 \\ 0 & 1 & -5/47 & 7610000/47 \\ 0 & 13 & -75 & 7690.000 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 3/5 & 3/2 & 55.500 \\ 0 & 1 & -5/47 & 7610.000/47 \\ 0 & 0 & -3460/47 & \frac{262.500.000}{47} \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 3/5 & 3/2 & \\ 0 & 1 & -5/47 & \\ 0 & 0 & 1 & \end{array}\right]$$

F2.(-13)+F3 — F3. $-\frac{47}{3460}$

→ 55.500

$\frac{7.610.000}{47}$

$\frac{-98.930.000}{47} + 7.690.000$

$\frac{-98.930.000}{47}$

$\frac{-18725000}{475}$

MAL X

$\frac{262.500.000}{47}$

$$\left[\begin{array}{ccc|c} 50 & 30 & 75 & 10.775.000 \\ 30 & 65 & 40 & 8.675.000 \\ 75 & 55 & 30 & 10.175.000 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 3/5 & 3/2 & 215.500 \\ 30 & 65 & 40 & 8.675.000 \\ 75 & 55 & 30 & 10.175.000 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 3/5 & 3/2 & 215.500 \\ 0 & 47 & -5 & 2210000 \\ 0 & 10 & -\frac{165}{2} & -5972500 \end{array}\right]$$

PUSO UN 70

F1. 1/50 — F1.(-30)+F2, F1.(-75)+F3 — F2. 1/47

MAL

Y MAL DE ATRACCIÓN

3460 | 2
1730 | 2
865 | 5
173 |

$$\left[\begin{array}{ccc|c} 1 & 3/5 & 3/2 & 215.500 \\ 0 & 1 & -5/47 & \frac{2210000}{47} \\ 0 & 10 & -165/2 & -5972500 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 3/5 & 3/2 & 215.500 \\ 0 & 1 & -5/47 & \frac{2210000}{47} \\ 0 & 0 & -\frac{7655}{94} & -\frac{258607500}{47} \end{array}\right]$$

F2.(-10)+F3

MAL

$\frac{2210000}{47} - 5972500$

$\frac{22100000}{47}$

$$\left[\begin{array}{ccc|c} 50 & 30 & 70 & 10.775.000 \\ 30 & 65 & 55 & 8.675.000 \\ 75 & 40 & 30 & 10.175.000 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 3/5 & 7/5 & 215500 \\ 30 & 65 & 55 & 8.675.000 \\ 75 & 40 & 30 & 10.175.000 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 3/5 & 7/5 & 215.500 \\ 0 & 47 & 13 & 2210000 \\ 0 & 13 & & \end{array}\right]$$

F1. 1/50 — F1.(-30)+F2

NO LO CONTINUASTE

IR HASTA EL FINAL Y DESPUÉS VERIFICAR

F1

$$\left[\begin{array}{ccc|c} 50 & 30 & 75 & 10.775.000 \\ 30 & 65 & 40 & 8.675.000 \\ 70 & 55 & 30 & 10.175.000 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 3/5 & 3/2 & 215.500 \\ 30 & 65 & 40 & 8.675.000 \\ 70 & 55 & 30 & 10.175.000 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 3/5 & 3/2 & 215.500 \\ 0 & 47 & -5 & 2.210.000 \\ 0 & 13 & -75 & -4.910.000 \end{array}\right]$$

F1. 1/50 — F1.(-30)+F2, F1.(-70)+F3 — F2. 1/47

SE ME HIZO MUCHAS VECES Y POR SE MALA CONFUSO Y NO DABA

$$\left[\begin{array}{ccc|c} 1 & 3/5 & 3/2 & 215.500 \\ 0 & 1 & -5/47 & \frac{2.210.000}{47} \\ 0 & 0 & 1 & 75.000 \end{array}\right] \Leftarrow \left[\begin{array}{ccc|c} 1 & 3/5 & 3/2 & 215.500 \\ 0 & 1 & -5/47 & \frac{2.210.000}{47} \\ 0 & 0 & -\frac{3460}{47} & -\frac{259.500.000}{47} \end{array}\right] \Leftarrow \left[\begin{array}{ccc|c} 1 & 3/5 & 3/2 & 215.500 \\ 0 & 1 & -5/47 & \frac{2.210.000}{47} \\ 0 & 13 & -75 & -4.910.000 \end{array}\right]$$

F3. $-\frac{47}{3460}$ — F2.(-13)+F3

3460 | 2
1730 | 2
259.500.000 | 20 — 865 | 5
12975000 | 173 — 173 | 173
75.000 — 1

$\frac{259.500.000}{3460}$

2595 500

$\frac{-28730000}{47} - 4.910.000 = \frac{-28...}{47}$ -230.770.000

$x + 5/5\,y + 3/2\,z = 215.500 \qquad x + 35.000 + 1125.000 = 215.500 \Rightarrow x = 215.500 - 1455.000$

$y + 5/47\,z = 2.210.000/47 \Rightarrow y - \frac{375.000}{47} = \frac{2.210.000}{47} \Rightarrow y = 55.000 \qquad x = 70.000$

$z = 75.000$

S.C.D. $\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 70.000 \\ 55.000 \\ 75.000 \end{bmatrix}$ BIEN✓

RTA: LA REFINERIA I NECESITARA 70.000 BARILES,
" " II " 55.000 " Y
" " III " 75.000 " .

II)

~~0,25.x + 0,5.y + z = 100~~ $x + y + z = 100$

$1/4\,x + 1/2\,y + z = 40$

$x = 2y \Rightarrow x - 2y + z = 0$

PRESTAR ATENCIÓN

$\begin{bmatrix} x \\ y \\ z \end{bmatrix}$: Nº DE MONEDAS DE C/U DE LOS TIPOS

SER PROLIJO Y ORDENADO!

$$\left[\begin{array}{ccc|c} 1 & 1 & 1 & 100 \\ 1/4 & 1/2 & 1 & 40 \\ 1 & -2 & 0 & 0 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 1 & 1 & 100 \\ 0 & 1/4 & 3/4 & 15 \\ 0 & -3 & -1 & -100 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 1 & 1 & 100 \\ 0 & 1 & 3 & 60 \\ 0 & -3 & -1 & -100 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 1 & 1 & 100 \\ 0 & 1 & 3 & 60 \\ 0 & 0 & 8 & 80 \end{array}\right]$$

F1.(-1/4)+F2 F1.(-1)+F3 F2.4 F2.(3)+F3 F3.1/8

VALEN −6 (2 circled)

72
12
16

ERROR AL INTERPRETAR EL EJERCICIO

$$\left[\begin{array}{ccc|c} 1 & 1 & 1 & 100 \\ 0 & 1 & 3 & 60 \\ 0 & 0 & 1 & 10 \end{array}\right] \Rightarrow$$

$x + y + z = 100 \quad x + 30 + 10 = 100 \Rightarrow x = 60$

$y + 3z = 60 \Rightarrow y + 30 = 60 \Rightarrow y = 30$

$z = 10$

S.C.D.

$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 60 \\ 30 \\ 10 \end{bmatrix}$ MAL X

RTA: EN EL PARQUIMETRO HAY 60 MONEDAS DE 0,25\$, 30 MONEDAS DE 0,5 \$ Y 10 MONEDAS DE 1 \$.

MAL

II)

$$\left[\begin{array}{ccc|c} 1 & 1 & 1 & 100 \\ 1/4 & 1/2 & 1 & 40 \\ 1 & -6 & 0 & 0 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 1 & 1 & 100 \\ 0 & 1/4 & 3/4 & 15 \\ 0 & -7 & -1 & -100 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 1 & 1 & 100 \\ 0 & 1 & 3 & 60 \\ 0 & -7 & -1 & -100 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 1 & 1 & 100 \\ 0 & 1 & 3 & 60 \\ 0 & 0 & 20 & 320 \end{array}\right] \Rightarrow$$

F1.(-1/4)+F2 F1.(-1)+F3 F2.4 F2.(7)+F3 F3.1/20

$$\left[\begin{array}{ccc|c} 1 & 1 & 1 & 100 \\ 0 & 1 & 3 & 60 \\ 0 & 0 & 1 & 16 \end{array}\right] \Rightarrow$$

$x + y + z = 100 \Rightarrow x + 12 + 16 = 100 \Rightarrow x = 100 - 28 = 72$

$y + 3z = 60 \Rightarrow y + 48 = 60 \Rightarrow y = 12$

$z = 16$

$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 72 \\ 12 \\ 16 \end{bmatrix}$ BIEN✓

RTA: EN EL PARQUIMETRO HAY 72 MONEDAS DE 0,25\$, 12 MONEDAS DE 0,5\$ Y 16 MONEDAS DE 1\$

III)

$x + y = z + 2$

$y - 2x = z - 10$

$x + y + z = 24$

$-2x + y - z = -10$

$$\left[\begin{array}{ccc|c} 1 & 1 & -1 & 2 \\ -2 & 1 & -1 & -10 \\ 1 & 1 & 1 & 24 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 1 & -1 & 2 \\ 0 & 3 & -3 & -6 \\ 0 & 0 & 2 & 22 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 1 & -1 & 2 \\ 0 & 1 & -1 & -2 \\ 0 & 0 & 2 & 22 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 1 & -1 & 2 \\ 0 & 1 & -1 & -2 \\ 0 & 0 & 1 & 11 \end{array}\right]$$

F1.(2)+F2 F1.(-1)+F3 F2.1/3 F3.1/2

$x + y - z = 2 \Rightarrow x + 9 - 11 = 2 \Rightarrow x = 2 + 2 = 4$

$y - z = -2 \Rightarrow y - 11 = -2 \Rightarrow y = 9$

$z = 11$

S.C.D.

$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 4 \\ 9 \\ 11 \end{bmatrix}$ BIEN✓

RTA: LOS 3 NUMEROS QUE FALTAN SON 4, 9 Y 11

IV) INCÓGNITA: CANTIDAD DE EMPLEADOS

$x+y+z=100$

$400.x + 160.y + 200.z = 27200$

$x = 2y \Rightarrow x - 2y + 0z = 0$

$$\left[\begin{array}{ccc|c} 1 & 1 & 1 & 100 \\ 400 & 160 & 200 & 27200 \\ 1 & -2 & 0 & 0 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 1 & 1 & 100 \\ 0 & -240 & -200 & -12.800 \\ 0 & -3 & -1 & -100 \end{array}\right] \Rightarrow$$

$F1.(-400)+F2$

$F1.(-1)+F3$

$F2.-1/240$

$$\left[\begin{array}{ccc|c} 1 & 1 & 1 & 100 \\ 0 & 1 & 5/6 & 160/3 \\ 0 & -3 & -1 & -100 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 1 & 1 & 100 \\ 0 & 1 & 5/6 & 160/3 \\ 0 & 0 & 3/2 & 60 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 1 & 1 & 100 \\ 0 & 1 & 5/6 & 160/3 \\ 0 & 0 & 1 & 40 \end{array}\right] \Rightarrow$$

$F2.3+F3$ $\quad$ $F3.2/3$

$\Rightarrow$ $x+y+z=100$; $y+5/6z=160/3$; $z=40$

$x + 20 + 40 = 100 \Rightarrow x = 100 - 60 = 40$

$y + \frac{100}{3} = \frac{160}{3} \Rightarrow y = 20$

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 40 \\ 20 \\ 40 \end{bmatrix}$$ BIEN ✓

RTA.: EN EL CURSO A HAY 40 EMPLEADOS

" " " B " 20 " y

" " " C " 40 " z

V) $2 = 2_2 1 + 2_1 1 + 2_0$

$2 = 4 2_2 + 2 2_1 + 2_0$

$4 = 9 2_2 + 3 2_1 + 2_0$

$$\left[\begin{array}{ccc|c} 1 & 1 & 1 & 2 \\ 4 & 2 & 1 & 2 \\ 9 & 3 & 1 & 4 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 1 & 1 & 2 \\ 0 & -2 & -3 & -6 \\ 0 & -6 & -8 & -14 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 1 & 1 & 2 \\ 0 & 1 & 3/2 & 3 \\ 0 & -6 & -8 & -14 \end{array}\right] \Rightarrow$$

$F1.(-4)+F2$ $\quad$ $F2.-1/2$ $\quad$ $F2.6+F3$

$F1.(-9)+F3$

$$\left[\begin{array}{ccc|c} 1 & 1 & 1 & 2 \\ 0 & 1 & 3/2 & 3 \\ 0 & 0 & 1 & 4 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & 1 & 0 & -2 \\ 0 & 1 & 0 & -3 \\ 0 & 0 & 1 & 4 \end{array}\right]$$

$x+y+z=2$ $\quad$ $x-3+4=2 \Rightarrow x=1$

$y+5/2z=3$ $\quad \Rightarrow y+6=3 \Rightarrow y=-3$

$z=4$

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ -3 \\ 4 \end{bmatrix}$$ S.C.D.

RTA: EL POLINOMIO ES $x^2 - 3x + 4 = y$ BIEN ✓

VI)

$-3 = 2_3 + 2_2 + 2_1 + 2_0$

$-1 = 8 2_3 + 4 2_2 + 2 2_1 + 2_0$

$9 = 27 2_3 + 9 2_2 + 3 2_1 + 2_0$

$33 = 64 2_3 + 16 2_2 + 4 2_1 + 2_0$

$$\left[\begin{array}{cccc|c} 1 & 1 & 1 & 1 & -3 \\ 8 & 4 & 2 & 1 & -1 \\ 27 & 9 & 3 & 1 & 9 \\ 64 & 16 & 4 & 1 & 33 \end{array}\right] \Rightarrow \left[\begin{array}{cccc|c} 1 & 1 & 1 & 1 & -3 \\ 0 & -4 & -6 & -7 & 23 \\ 0 & -18 & -24 & -26 & 90 \\ 0 & -48 & -60 & -63 & 225 \end{array}\right]$$

$F1.(-8)+F2$

$F1.(-27)+F3$

$F1.(-64)+F4$

$F2.-1/4$

$$\left[\begin{array}{cccc|c} 1 & 1 & 1 & 1 & -3 \\ 0 & 1 & 3/2 & 7/4 & -23/4 \\ 0 & -18 & -24 & -26 & 90 \\ 0 & -48 & -60 & -63 & 225 \end{array}\right] \Rightarrow \left[\begin{array}{cccc|c} 1 & 1 & 1 & 1 & -3 \\ 0 & 1 & 3/2 & 7/4 & -23/4 \\ 0 & 0 & 3 & 11/2 & -27/2 \\ 0 & 0 & 12 & 21 & -54 \end{array}\right] \Rightarrow \left[\begin{array}{cccc|c} 1 & 1 & 1 & 1 & -3 \\ 0 & 1 & 3/2 & 7/4 & -23/4 \\ 0 & 0 & 1 & 11/6 & -9/2 \\ 0 & 0 & 12 & 21 & -54 \end{array}\right] \Rightarrow$$

$F2.18+F3$

$F2.48+F4$

$F3.1/3$

$F3.(-12)+F4$

$$\left[\begin{array}{cccc|c} 1 & 1 & 1 & 1 & -3 \\ 0 & 1 & 3/2 & 7/4 & -23/4 \\ 0 & 0 & 1 & 11/6 & -9/2 \\ 0 & 0 & 0 & -1 & 3 \end{array}\right] \Rightarrow \left[\begin{array}{cccc|c} 1 & 1 & 1 & 1 & -3 \\ 0 & 1 & 3/2 & 7/4 & -23/4 \\ 0 & 0 & 1 & 11/6 & -9/2 \\ 0 & 0 & 0 & 1 & -3 \end{array}\right] \Rightarrow$$

$F4.(-1)$

$x+y+z+2=-3$

$y+5/2z+7/4z=-23/4$

$z+11/6z=-9/2$

$z=-3$

$z - 17/2 = -9/2 \Rightarrow z = -9/2 + 17/2 = 7$

$y + 3/2 - 27/8 = -23/4 \Rightarrow y - 15/4 = -23/8 \Rightarrow y = -23/8 + 15/4 = -2$

$x - 2 + 1 - 3 = -3 \Rightarrow x - 4 = -3 \Rightarrow x = -3 + 4 = 1$

$\begin{bmatrix} x \\ y \\ z \\ a \end{bmatrix} = \begin{bmatrix} 1 \\ -2 \\ 1 \\ -3 \end{bmatrix}$ S.C.D.

RTA: El polinomio es $y = x^3 - 2x^2 + x - 3$ BIEN ✓

VII) V x h a)

A) $100 + 200 = x_1 + x_4$ B) $x_1 + x_2 = 100 + 150$ C) $50 + 50 = x_3 + x_2$ D) $x_4 + x_3 = 100 + 50$

$300 = x_1 + x_4$ $x_1 + x_2 = 250$ $100 = x_3 + x_2$ $x_4 + x_3 = 150$

$-x_1 - x_4 = -300$ $x_1 + x_2 = 250$ $-x_3 - x_2 = -100$ $x_4 + x_3 = 150$

$$\left[\begin{array}{cccc|c} -1 & 0 & 0 & -1 & -300 \\ 1 & 1 & 0 & 0 & 250 \\ 0 & -1 & -1 & 0 & -100 \\ 0 & 0 & 1 & 1 & 150 \end{array}\right] \Rightarrow \left[\begin{array}{cccc|c} 1 & 1 & 0 & 0 & 250 \\ -1 & 0 & 0 & -1 & -300 \\ 0 & -1 & -1 & 0 & -100 \\ 0 & 0 & 1 & 1 & 150 \end{array}\right] \Rightarrow \left[\begin{array}{cccc|c} 1 & 1 & 0 & 0 & 250 \\ 0 & -1 & 0 & -1 & -550 \\ 0 & -1 & -1 & 0 & -100 \\ 0 & 0 & 1 & 1 & 150 \end{array}\right] \Rightarrow \left[\begin{array}{cccc|c} 1 & 1 & 0 & 0 & 250 \\ 0 & 1 & 0 & 1 & 550 \\ 0 & -1 & -1 & 0 & -100 \\ 0 & 0 & 1 & 1 & 150 \end{array}\right]$$

$F1 \to F2$ $F1.(-1)+F2$ $F2.(-1)$ $F2.(-1)+F3$

$$\left[\begin{array}{cccc|c} 1 & 1 & 0 & 0 & 250 \\ 0 & 1 & 0 & 1 & 550 \\ 0 & 0 & -1 & -1 & -450 \\ 0 & 0 & 1 & 1 & 150 \end{array}\right] \Rightarrow \left[\begin{array}{cccc|c} 1 & 1 & 0 & 0 & 250 \\ 0 & 1 & 0 & 1 & 550 \\ 0 & 0 & 1 & 1 & +450 \\ 0 & 0 & 1 & 1 & 150 \end{array}\right] \Rightarrow \left[\begin{array}{cccc|c} 1 & 1 & 0 & 0 & 250 \\ 0 & 1 & 0 & 1 & 550 \\ 0 & 0 & 1 & 1 & 450 \\ 0 & 0 & 0 & 0 & -300 \end{array}\right]$$ MAL

$F3.(-1)$ $F3.(-1)+F4$

$$\left[\begin{array}{cccc|c} 1 & 0 & 0 & 1 & 300 \\ 1 & 1 & 0 & 0 & 250 \\ 0 & 1 & 1 & 0 & 100 \\ 0 & 0 & 1 & 1 & 150 \end{array}\right] \Rightarrow \left[\begin{array}{cccc|c} 1 & 0 & 0 & 1 & 300 \\ 0 & 1 & 0 & -1 & -50 \\ 0 & 1 & 1 & 0 & 100 \\ 0 & 0 & 1 & 1 & 150 \end{array}\right] \Rightarrow \left[\begin{array}{cccc|c} 1 & 0 & 0 & 1 & 300 \\ 0 & 1 & 0 & -1 & -50 \\ 0 & 0 & 1 & 1 & 150 \\ 0 & 0 & 1 & 1 & 150 \end{array}\right] \Rightarrow \left[\begin{array}{cccc|c} 1 & 0 & 0 & 1 & 300 \\ 0 & 1 & 0 & -1 & -50 \\ 0 & 0 & 1 & 1 & 150 \\ 0 & 0 & 0 & 0 & 0 \end{array}\right]$$

x_1 x_2 x_3 x_4

$F1.(-1)+F2$ $F2.(-1)+F3$ $F3.(-1)+F4$

$x_1 + x_4 = 300 \Rightarrow x_1 = -x_4 + 300$

$x_2 - x_4 = -50 \Rightarrow x_2 = x_4 - 50$ ~~$\Rightarrow x_2 = -x_4 + 150 - 50 \Rightarrow x_2 = -x_4 + 100$~~

$x_3 + x_4 = 150 \Rightarrow x_3 = -x_4 + 150$

RE HACER

$$\begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} -t + 300 \\ t - 50 \\ -t + 150 \\ t \end{bmatrix} = \begin{bmatrix} 300 - t \\ -50 + t \\ 150 - t \\ t \end{bmatrix}$$

Dm: $50 \leq t \leq 150$

x QUE LOS VEHICULOS NO PUEDEN SER NEGATIVOS.

cont.

RE HACER

MAL ENTENDIDO BIEN

RE HACER

$0 = 300 - t \Rightarrow t = 300$

$0 = 50 + t \Rightarrow t = -50$ MAL

$0 = 150 - t \Rightarrow t = 150$

$0 = t \Rightarrow t = 0$

$x_1 = -50 + 300 = 250$ $x_1 = 300 - 150 = 150$

~~$x_2 = -50 + 150 = 100$~~

~~$x_3 = -50 + 150 = 100$~~

$x_4 = 50$

$150 \leq x_4 \leq 250$

IMPORTANTE REVISAR

VII) PARA RESOLVER EL 7 LO QUE SE HACE ES LA MATRIZ HASTA LLEGAR A LA MATRIZ SOLUCIÓN QUE SIEMPRE VA A SER UN SISTEMA COMPATIBLE INDETERMINADO, YA QUE VAN A VER SIEMPRE MUCHAS MANERAS DE CIRCULAR LAS CALLES, DE TODAS MUCHAS MANERAS, EL TRÁFICO NUNCA PUEDE SER NEGATIVO, Y LO QUE SE BUSCA EL DOMINIO DE t (PARÁMETRO).

PARA EL PUNTO B LO QUE SE HACE ES CALCULAR EL DOMINIO (MÁXIMO Y MÍNIMO) EN EL PASAJE INDICADO Y REDISEÑAR LA SOLUCIÓN.

EJERCICIO DE MECHO

a)

A) $100+200 = x_1+x_4 \Rightarrow 300 = x_1+x_4 \Rightarrow x_1+x_4 = 300$

B) $x_1+x_2 = 100+150 \Rightarrow x_1+x_2 = 250$

C) $50+50 = x_2+x_3 \Rightarrow 100 = x_2+x_3 \Rightarrow x_2+x_3 = 100$

D) $x_4+x_3 = 100+50 \Rightarrow x_4+x_3 = 150$

$$\left[\begin{array}{cccc|c} 1&0&0&1&300\\ 1&1&0&0&250\\ 0&1&1&0&100\\ 0&0&1&1&150 \end{array}\right] \Rightarrow \left[\begin{array}{cccc|c} 1&0&0&1&300\\ 0&1&0&-1&-50\\ 0&1&1&0&100\\ 0&0&1&1&150 \end{array}\right] \Rightarrow \left[\begin{array}{cccc|c} 1&0&0&1&300\\ 0&1&0&-1&-50\\ 0&0&1&1&150\\ 0&0&1&1&150 \end{array}\right] \Rightarrow \left[\begin{array}{cccc|c} 1&0&0&1&300\\ 0&1&0&-1&-50\\ 0&0&1&1&150\\ 0&0&0&0&0 \end{array}\right] \Rightarrow$$

$F1.(-1)+F2$ $\quad$ $F2.(-1)+F3$ $\quad$ $F3.(-1)+F4$

$x_1+x_4 = 300 \Rightarrow x_1 = 300-x_4$

$x_2-x_4 = -50 \Rightarrow x_2 = x_4-50$

$x_3+x_4 = 150 \Rightarrow x_3 = 150-x_4$

$$\begin{bmatrix} x_1\\ x_2\\ x_3\\ x_4 \end{bmatrix} = \begin{bmatrix} 300-t\\ t-50\\ 150-t\\ t \end{bmatrix} \qquad 50 \leq t \leq 150 \qquad t \text{ EN } V/h$$

CON $t=80$ x_4

$$\begin{bmatrix} x_1\\ x_2\\ x_3\\ x_4 \end{bmatrix} = \begin{bmatrix} 300-80 = 220\\ 80-50 = 30\\ 150-80 = 70\\ 80 \end{bmatrix} = \begin{bmatrix} 220\\ 30\\ 70\\ 80 \end{bmatrix}$$

CON $t=100$

$$\begin{bmatrix} x_1\\ x_2\\ x_3\\ x_4 \end{bmatrix} = \begin{bmatrix} 300-100 = 200\\ 100-50 = 50\\ 150-100 = 50\\ 100 \end{bmatrix} = \begin{bmatrix} 200\\ 50\\ 50\\ 100 \end{bmatrix}$$ BIEN✓

b) $x_1 = 300-t \Rightarrow$ ~~$x_1 \leq 300$~~ .*

$x_1 = 300-50 = 250$

$x_4 = 300-150 = 150$

$150 \leq x_1 \leq 250$ BIEN✓

RTA: LA REFLORMA MÍNIMA QUE PUEDE HABER EN EL PASAJE A-B (x_1) ES DE 150 VEHÍCULOS X HORA.

2a) b) VERIFICAR LOS RESULTADOS RESOLVIENDO LOS SISTEMAS UTILIZANDO ESTA CALCULADORA

I: $\quad$ II: $\quad$ III $\quad$ IV: $\quad$ V: $\quad$ VI: $\quad$ VII:

EJERCICIO A DE MACORRA

23) B $\quad$ 24) A

23) B)

$$\left[\begin{array}{cc|c} -1/2 & 2/3 & -1/4\\ 3 & -4 & 3/2 \end{array}\right] \Rightarrow \left[\begin{array}{cc|c} 1 & -4/3 & 1/2\\ 3 & -4 & 3/2 \end{array}\right] \Rightarrow \left[\begin{array}{cc|c} 1 & -4/3 & 1/2\\ 0 & 0 & 0 \end{array}\right] \Rightarrow$$

$F1.-2$ $\quad$ $F1.(-3)+F2$

$x = 4/3\,y + 1/2$

$x = 4/3\,y + 1/2$

$$\begin{bmatrix} x\\ y \end{bmatrix} = \begin{bmatrix} 4/3\,t + 1/2\\ t \end{bmatrix}$$

EL RESULTADO S.C.I. ES CORRECTO

EL EJERCICIO DEBE RESOLVERSE EN EL RESULTADO DE LA HOJA

2a) A) x, y, z

$x = 2y + 1/2\,z \Rightarrow x-2y-1/2z = 0$

$y+z = x+1 \Rightarrow -x+y+z = 1$

$(x+z)-y = 5 \quad x+z-y = 5$

$$\left[\begin{array}{ccc|c} 1&-2&-1/2&0\\ -1&1&1&1\\ 1&-1&1&5 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1&-2&-1/2&0\\ 0&-1&3/2&1\\ 0&1&3/2&5 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1&-2&-1/2&0\\ 0&1&-1/2&-1\\ 0&1&3/2&5 \end{array}\right] \Rightarrow$$

$F1.(+1)+F2$ $\quad$ $F2.(-1)$ $\quad$ $F2.(-1)+F3$

$F1.(-1)+F3$

$$\left[\begin{array}{ccc|c} 1 & -2 & -1/2 & 0 \\ 0 & 1 & -1/2 & -1 \\ 0 & 0 & 2 & 6 \end{array}\right] \Rightarrow \left[\begin{array}{ccc|c} 1 & -2 & -1/2 & 0 \\ 0 & 1 & -1/2 & -1 \\ 0 & 0 & 1 & 3 \end{array}\right]$$

F3. 1/2

$x - 2y + 1/2z = 0 \quad x = 2y + 1/2z \Rightarrow x = 1 + 3/2 = 5/2$

$y - 1/2z = -1 \Rightarrow y = -1 + 1/2z \Rightarrow y = -1 + 3/2 = 1/2$

$z = 3$

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 5/2 \\ 1/2 \\ 3 \end{bmatrix}$$

BIEN ✓

S.C.D.

RTA: Los 3 N° son 5/2, 1/2 y 3