

Ejercicio Regla de Cramer

$$01-a) \begin{cases} 2x - y = 2 \\ -x + 3y = -3 \end{cases} D = \begin{vmatrix} 2 & -1 \\ -1 & 3 \end{vmatrix} = 6 - 1 = 5$$

$$Dx = \begin{vmatrix} 2 & -1 \\ -3 & 3 \end{vmatrix} = 6 - 3 = 3 \quad Dy = \begin{vmatrix} 2 & 2 \\ -1 & -3 \end{vmatrix} = -6 - (-2) = -4$$

$$x = \frac{Dx}{D} = \frac{3}{5} \quad y = \frac{Dy}{D} = \frac{-4}{5} \quad V = \left\{ \left(\frac{3}{5}, \frac{-4}{5} \right) \right\}$$

D S T Q Q S S
L M M J Y S

ANSWER

$$5) \begin{cases} 3x - y + z = 1 \\ 2x + 3z = -1 \\ 4x + y - 2z = 7 \end{cases} \quad D = \begin{vmatrix} 3 & -1 & 1 \\ 2 & 0 & 3 \\ 4 & 1 & -2 \end{vmatrix} \quad \begin{matrix} 0 & 9 & 1 \\ 3 & -1 & \\ 2 & 0 & 3 \\ 4 & 1 & -2 \end{matrix} = -10 - 13 = -23$$

$$D -12 \cdot 2 = -10$$

$$Dx = \begin{vmatrix} 1 & -1 & 1 \\ -1 & 0 & 3 \\ 2 & 1 & -2 \end{vmatrix} \quad D = -23 \quad \begin{matrix} 0 & 3 & -2 = 1 \\ 1 & -1 & 1 \\ -1 & 0 & 3 \\ 2 & 1 & -2 \end{matrix}$$

$$x = \frac{Dx}{D} = \frac{-23}{-23} = 1$$

$$Dy = \begin{vmatrix} 3 & 1 & 1 \\ 2 & -1 & 3 \\ 4 & 2 & -2 \end{vmatrix} \quad D = -23 \quad \begin{matrix} 0 & -21 & -1 = -22 \\ -4 & 63 & -4 = 55 \end{matrix} \quad \begin{matrix} y = \frac{Dy}{D} = \frac{-23}{-23} = 1 \\ 1 & 0 & -23 \end{matrix}$$

$$y = \frac{Dy}{D} = \frac{-23}{-23} = 1$$

$$Dz = \begin{vmatrix} 3 & -1 & 1 \\ 2 & 0 & 3 \\ 4 & 1 & 2 \end{vmatrix} \quad D = 23 \quad \begin{matrix} 0 & -3 & -14 = -17 \\ 1 & 12 & 14 = 32 \end{matrix} \quad \begin{matrix} z = \frac{Dz}{D} = \frac{23}{23} = -1 \\ D & -23 \end{matrix}$$

$$z = \frac{Dz}{D} = \frac{23}{23} = -1$$

$$Q2 - \begin{cases} 3x + 4y - z = 1 \\ 4x + 5y + 2z = 12 \\ x - 2y + 3z = 8 \end{cases} \quad D = \begin{vmatrix} 3 & 4 & -1 & 3 & 4 \\ 4 & 5 & 2 & 4 & 5 \\ 1 & -2 & 3 & 1 & -2 \end{vmatrix} = 61 - 31 = 30$$

$$-5 - 12 \cdot 48 = 31$$

$$-12 \cdot 48 / 12 = 48$$

$$45 \cdot 8 / 8 = 61$$

$$Dy = \begin{vmatrix} 3 & 1 & -1 & 3 & 1 \\ 4 & 12 & 2 & 4 & 12 \\ 1 & 8 & 3 & 1 & 8 \end{vmatrix} = 78 - 48 = 30$$

$$108 \cdot 2 / 32 = 78$$

(A)

$$y = \frac{Dy}{D} = \frac{30}{30} = 1$$

$$\boxed{y = 1}$$

U

data
fecha

D S T Q Q S S
D L M M I V S

03- $\begin{cases} x + 2y + z = 1 \\ 3x + y - 11z = -2 \\ 2x + 3y - z = 1 \end{cases}$

$$D = \begin{vmatrix} 1 & 2 & 1 & 1 & 2 \\ 3 & 1 & -11 & 3 & 1 \\ 2 & 3 & 1 & 2 & 3 \end{vmatrix} = -36 + 37 = 1$$

$$DX = \begin{vmatrix} 1 & -33 & 4 & -28 \\ 1 & 2 & 1 & 2 \\ -2 & 1 & -11 & -2 \\ 1 & 3 & -1 & 1 \end{vmatrix} = -29 + 28 = -1$$

$$X = DX / D = -1 / 1 = -1$$

$$-1 -22 -6 = -29$$

$$DY = \begin{vmatrix} 1 & -11 & -3 & -18 \\ 1 & 1 & 1 & 1 \\ 3 & -2 & -11 & 3 \\ 2 & 1 & -1 & 2 \end{vmatrix} = -17 + 18 = 1$$

$$Y = DY / D = 1 / 1 = 1$$

$$DZ = \begin{vmatrix} 1 & 2 & 1 & 1 & 2 \\ 3 & 1 & -2 & 3 & 1 \\ 2 & 3 & 1 & 2 & 3 \end{vmatrix} = 2 - 2 = 0$$

$$Z = DZ / D = 0 / 1 = 0$$

$$DX = \begin{vmatrix} 1 & 2 & 1 & 1 & 2 \\ 3 & 1 & -2 & 3 & 1 \\ 2 & 3 & 1 & 2 & 3 \end{vmatrix} = 2 - 2 = 0$$

$$a + b + c = -1 + 1 + 0 = 0$$

$$DX = \begin{vmatrix} 1 & -8 & 9 & 2 \\ 1 & 2 & 1 & 2 \\ 3 & 1 & -2 & 3 \\ 2 & 3 & 1 & 2 \end{vmatrix} = -9 - 2 - 4 = -15$$

$$04- \begin{cases} x + 2y - 3z = 2 \\ x + 3y + 2z = 4 \\ x - y - 2z = 8 \end{cases}$$

$$D = \begin{vmatrix} 1 & 2 & -3 & 1 & 2 \\ 1 & 3 & 2 & 1 & 2 \\ 1 & -1 & -2 & 1 & -1 \end{vmatrix} = 1 + 15 = 16$$

$$-72 -58 -16 = -146$$

$$-9 -2 -4 = -15$$

$$DX = \begin{vmatrix} 2 & 2 & -3 & 2 & 2 \\ 4 & 3 & 2 & 4 & 2 \\ 8 & -1 & -2 & 8 & -1 \end{vmatrix} = -130 + 146 = 16$$

$$-174 -32 -12 = -130$$

$$-12 -16 -58 = -54$$

$$DY = \begin{vmatrix} 1 & 2 & -3 & 1 & 2 \\ 1 & 4 & 2 & 1 & 4 \\ 1 & 8 & -2 & 1 & 8 \end{vmatrix} = 26 + 54 = 80$$

$$-8 -58 -24 = 20$$

D 8 9 T 0 Q 3 I
G L M M Y S

$$DZ = \begin{vmatrix} 1 & 2 & 29 \\ 1 & 3 & 1 \\ 1 & -1 & 8 \end{vmatrix} = 1 \cdot 3 \cdot 1 - 1 \cdot 2 \cdot 8 = 3 - 16 = -13$$

$$\frac{87 - 4 \cdot 16}{16} = \frac{99}{16} = 6$$

$$X = \frac{Dx}{D} = \frac{16}{16} = 1$$

$$24 - 8 \cdot 29 = 3$$

$$Y = \frac{Dy}{D} = \frac{80}{16} = 5$$

$$Z = \frac{Dz}{D} = \frac{-96}{16} = -6$$

$$X + Y + Z$$

$$1 + 5 - 6 = 0 \quad \textcircled{A}$$

$$\textcircled{B} \quad \begin{cases} 2x + y = 5 \\ 2y + z = 3 \\ 3x + 2y + z = 7 \end{cases} \quad \begin{cases} 3x + 2y + z = 7 \\ 2y + z = 3 \end{cases} \quad \left[\begin{array}{l} 3x + 2y + z = 7 \\ 2y + z = 3 \end{array} \right] \cdot (-1)$$

$$\begin{array}{l} 3x = 4 \\ | \times \frac{4}{3} \end{array} \quad \begin{array}{l} 2x + y = 5 \\ 2 \cdot \frac{4}{3} + y = 5 \\ | \quad \frac{8}{3} \end{array} \quad \begin{array}{l} 2y + z = 3 \\ 2 \cdot \frac{2}{3} + z = 3 \\ | \quad \frac{4}{3} \end{array} \quad \textcircled{D}$$

$$y = \frac{5-8}{3} = \frac{-3}{3} = -1$$

$$z = \frac{3-14}{3} = \frac{-11}{3} = -\frac{11}{3}$$

$$y = \frac{15-8}{3} = \frac{7}{3}$$

$$z = \frac{9-14}{3} = \frac{-5}{3}$$

$$\textcircled{E} - \begin{array}{l} 1 \ 0 \ 0 \\ 2 \ 1 \ 0 \\ -1 \ 2 \ 2 \end{array} \cdot \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 3 \\ 7 \\ -1 \end{bmatrix} \quad \left\{ \begin{array}{l} x = 3 \\ 2x + y = 7 \\ -x + 2y + 2z = -1 \end{array} \right.$$

$$\begin{array}{l} 2x + y = 7 \\ 2 \cdot 3 + y = 7 \\ | \quad 6 + y = 7 \\ y = 7 - 6 \\ y = 1 \end{array} \quad \begin{array}{l} -x + 2y + 2z = -1 \\ -3 + 2 \cdot 1 + 2z = -1 \\ | \quad -3 + 2 + 2z = -1 \\ 2z = -1 + 1 \\ z = \frac{0}{2} \\ z = 0 \end{array} \quad \textcircled{E}$$

$$\boxed{z = 0}$$

Berechnen LGS allgemein (Gauß)

01- $\begin{cases} 2x - y - 3z = -5 \\ x + 3y - z = 11 \\ x - 5z = 3 \end{cases}$

$$\left[\begin{array}{ccc|c} 2 & -1 & -3 & -5 \\ 1 & 3 & -1 & 11 \\ -2 & -1 & 1 & 3 \end{array} \right] \xrightarrow{-3R_1+R_2} \left[\begin{array}{ccc|c} 2 & -1 & -3 & -5 \\ 0 & 10 & -4 & 16 \\ -2 & -1 & 1 & 3 \end{array} \right] \xrightarrow{-2R_1+R_3} \left[\begin{array}{ccc|c} 2 & -1 & -3 & -5 \\ 0 & 10 & -4 & 16 \\ 0 & -1 & 7 & 11 \end{array} \right]$$

$$-25z = 25 \quad x - 5z = 3 \quad x + 3y - z = 11$$

$$\boxed{z = -1}$$

$$x - 5(-1) = 3 \quad -2 + 3y + 1 = 11$$

$$x = 3 + 5$$

$$3y = 12$$

$$\boxed{x = -2}$$

$$\boxed{y = 4}$$

02- $\begin{cases} x = 2y \\ 2y = 3z \\ x + y + z = 11 \end{cases}$

$$\begin{aligned} x &= 2y \\ y &= \frac{x}{2} \\ z &= \frac{x}{3} \end{aligned}$$

$$x + y + z = 11 \quad 2y = x \quad z = \frac{x}{3} \quad x + 2y + 3z =$$

$$x + \frac{x}{2} + \frac{x}{3} = 11 \quad y = \frac{6}{2} \quad z = \frac{6}{3} \quad 6 + 2 \cdot 3 + 3 \cdot 2 =$$

$$\frac{11x}{6} = 11 \quad y = 3 \quad z = 2 \quad 6 + 6 + 6 = \boxed{18}$$

$$\frac{11x}{6} = 11 \quad y = 3 \quad z = 2 \quad \textcircled{B}$$

$$11x = 66 \quad \textcircled{B}$$

$$x = 6$$

03- $\begin{cases} x+y+z=0 \\ 2x-y-2z=1 \\ 6y+3z=-12 \end{cases}$

-21

$$\begin{array}{r} -2 \\ \text{L} \left(\begin{array}{ccc|c} 1 & 1 & 1 & 0 \\ 2 & -1 & -2 & 1 \\ 0 & 6 & 3 & -12 \end{array} \right) \sim \left(\begin{array}{ccc|c} 0 & 3 & 4 & 1 \\ 0 & 6 & 3 & -12 \\ 0 & 0 & -5 & -10 \end{array} \right) \sim \left(\begin{array}{ccc|c} 0 & 1 & \frac{4}{3} & \frac{1}{3} \\ 0 & 0 & 1 & -2 \\ 0 & 0 & -5 & -10 \end{array} \right) \end{array}$$

$-5z = -10$

$\boxed{z = 2}$

(D)

04- $\begin{cases} x+y+z=68 \\ y+0,2z=x \\ 0,2x+y+z=3y \end{cases}$

$20\% \rightarrow \sqrt{1,100} = \sqrt{1,00,2}$

$x + 0,2z = 1,00,2$

$x + 0,2z = 1,00,2$

$x = y + 0,2z$

$x + y + z = 68$

$(y + 0,2z) + y + z = 68$

$1,2z + 2y = 68$

$2y = 68 - 1,2z$

$y = 34 - 0,6z$

$x + y + z = 68$

$x + y + 3z = 68$

$x + y = 33$

$x + 3y - 0,6 \cdot 3z = 33$

$x + 3y - 2z = 33$

$x = 33 - 3y$

$\boxed{x = 20}$

$0,2x + z = 3y$

$(y + 0,2z) + 0,2z + z = 3(y + 0,2z)$

$x + y + z = 68$

$0,2y + 0,04z + z = 102 - 1,8z$

$20 + y + 3z = 68$

$0,04z + z + 1,8z = 102 - 0,2y$

$y = 68 - 3z$

$2,84z = 102 - 0,2(34 - 0,6z)$

$\boxed{y = 13}$

$2,84z = 102 - 6,8 + 0,12z$

$2,84z - 0,12z = 95,2$

$\underline{z = 95,2}$

$2,172$

$\boxed{z = 35}$

Q: Assim, como o valor

A\$ 35,00 é Ali A\$ 20,00,

Ali tem A\$ 95,00 a menos

que Caco. (A)

05-

$$A = \begin{bmatrix} 0 & 3 & 4 \\ 1 & 0 & 5 \\ 2 & 1 & 0 \end{bmatrix} \quad X = \begin{bmatrix} x \\ y \\ z \end{bmatrix} \quad AX = \begin{bmatrix} 3x+4z \\ x+5z \\ 2x+y \end{bmatrix}$$

$$\begin{array}{l} 3x+4z=134 \\ x+5z=115 \\ 2x+y=48 \end{array} \quad -3 \left(\begin{array}{ccc|c} 0 & 3 & 4 & 134 \\ 1 & 0 & 5 & 115 \\ 2 & 1 & 0 & 48 \end{array} \right)$$

$$6. \left(\begin{array}{ccc|c} -6 & 0 & 4 & -10 \\ 1 & 0 & 5 & 115 \end{array} \right) \sim \left(\begin{array}{ccc|c} 0 & 0 & 34 & 680 \\ 1 & 0 & 5 & 115 \end{array} \right) \quad \begin{array}{l} 34z=680 \\ z=20 \end{array}$$

$$\begin{array}{l} x+5z=115 \\ x+5 \cdot 20=115 \\ x=115-100 \\ x=15 \end{array} \quad \begin{array}{l} 2x+y=48 \\ 2 \cdot 15 + y = 48 \\ y = 48 - 30 \\ y = 18 \end{array} \quad \begin{array}{l} x+y+z= \\ 15+18+20=\text{P\$ } 53,00 \\ \textcircled{A} \end{array}$$