Nome: Arthur Hernandes Silva de Souza **CTII 350**

Tarefa Básica

Regra de Cramer

1.

a) $\begin{cases} 2x - y = 2 \\ -x + 3y = -3 \end{cases}$

$D = \begin{vmatrix} 2 & -1 \\ -1 & 3 \end{vmatrix}$ $6 - 1 = 5$

$Dx = \begin{vmatrix} 2 & -1 \\ -3 & 3 \end{vmatrix}$ $6 - 3 = 3$

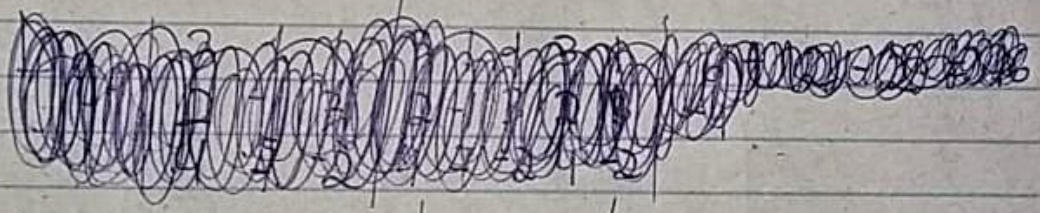
$Dy = \begin{vmatrix} 2 & 2 \\ -1 & -3 \end{vmatrix}$ $-6 - (-2) = -4$

$x = \frac{3}{5}$; $y = \frac{-4}{5}$

b) $3x - y + z = 1$
$2x + 3z = -1$
$4x + y - 2z = 7$

$$D = \begin{vmatrix} 3 & -1 & 1 \\ 2 & 0 & 3 \\ 4 & 1 & -2 \end{vmatrix} \quad \begin{matrix} 3 & -1 & 1 & 3 & -1 \\ 2 & 0 & 3 & 2 & 0 \\ 4 & 1 & -2 & 4 & 1 \end{matrix} \quad \begin{matrix} 0+(-12)+2 \\ 0+9+4 \\ -10-13=-23 \end{matrix}$$

$$D_x = \begin{vmatrix} 1 & -1 & 1 \\ -1 & 0 & 3 \\ 7 & 1 & -2 \end{vmatrix} \quad \begin{matrix} 1 & -1 & 1 & 1 & -1 \\ -1 & 0 & 3 & -1 & 0 \\ 7 & 1 & -2 & 7 & 1 \end{matrix} \quad \begin{matrix} 0-21-1=-22 \\ 0+3-2=1 \\ -22-1=-23 \end{matrix}$$



$$D_y = \begin{matrix} 3 & 1 & 1 \\ 2 & -1 & 3 \\ 4 & 7 & -2 \end{matrix} \quad \begin{matrix} 3 & 1 \\ 2 & -1 \\ 4 & 7 \end{matrix} \quad \begin{matrix} 6+12+14=32 \\ -4+63-4=55 \\ 32-55=-23 \end{matrix}$$

$$D_z = \begin{matrix} 3 & -1 & 1 \\ 2 & 0 & -1 \\ 4 & 1 & 7 \end{matrix} \quad \begin{matrix} 3 & -1 \\ 2 & 0 \\ 4 & 1 \end{matrix} \quad \begin{matrix} 0+4+2=6 \\ 0-3-14=-17 \\ 6-(-17)=23 \end{matrix}$$

$x = \frac{-23}{-23}$ $y = \frac{-23}{-23}$ $z = \frac{23}{-23}$

$x = 1, y = 1, z = -1$

2.

$3x + 4y - z = 1$
$4x + 5y + 2z = 12$
$x - 2y + 3z = 8$

$$D = \begin{vmatrix} 3 & 4 & -1 \\ 4 & 5 & 2 \\ 1 & -2 & 3 \end{vmatrix} \begin{matrix} 3 & 4 \\ 4 & 5 \\ 1 & -2 \end{matrix} \quad \begin{matrix} 45 + 8 + 8 = 61 \\ -5 - 12 + 48 = 31 \\ 61 - 31 = 30 \end{matrix}$$

$$D_y = \begin{vmatrix} 3 & 1 & -1 \\ 4 & 12 & 2 \\ 1 & 8 & 3 \end{vmatrix} \begin{matrix} 3 & 1 \\ 4 & 12 \\ 1 & 8 \end{matrix} \quad \begin{matrix} 108 + 2 - 32 = 78 \\ -12 + 48 + 12 = 48 \\ 78 - 48 = 30 \end{matrix}$$

$$y = \frac{D_y}{D} \quad y = \frac{30}{30} \quad y = 1$$

Letra A

3.

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

$$D = \begin{vmatrix} 1 & 2 & 1 \\ 3 & 1 & -11 \\ 2 & 3 & -1 \end{vmatrix} \begin{matrix} 1 & 2 \\ 3 & 1 \\ 2 & 3 \end{matrix} \quad \begin{matrix} -1 - 44 + 9 = -36 \\ 2 - 33 - 6 = -37 \\ -36 - (-37) = 1 \end{matrix}$$

$$D_x = \begin{vmatrix} 1 & 2 & 1 \\ -2 & 1 & -11 \\ 1 & 3 & -1 \end{vmatrix} \begin{matrix} 1 & 2 \\ -2 & 1 \\ 1 & 3 \end{matrix} \quad \begin{matrix} -1 - 22 - 6 = -29 \\ 1 - 33 + 4 = -28 \\ -29 - (-28) = -1 \end{matrix}$$

$$D_y = \begin{vmatrix} 1 & 1 & 1 \\ 3 & -2 & -11 \\ 2 & 1 & -1 \end{vmatrix} \begin{matrix} 1 & 1 \\ 3 & -2 \\ 2 & 1 \end{matrix} \quad \begin{matrix} 2 - 22 + 3 = -17 \\ -4 - 11 - 3 = -18 \\ -17 - (-18) = 1 \end{matrix}$$

$$D_z = \begin{vmatrix} 1 & 2 & 1 \\ 3 & 1 & -2 \\ 2 & 3 & 1 \end{vmatrix} \begin{matrix} 1 & 2 \\ 3 & 1 \\ 2 & 3 \end{matrix} \quad \begin{matrix} 1 - 8 + 9 = 2 \\ 2 - 6 + 6 = 2 \\ 2 - 2 = 0 \end{matrix}$$

$$-\frac{1}{1} + \frac{1}{1} + 0 = 0$$

Letra C

4.

$$x + 2y - 3z = 29$$
$$x + 3y + 2z = 4$$
$$x - y - 2z = 8$$

$$D = \begin{vmatrix} 1 & 2 & -3 \\ 1 & 3 & 2 \\ 1 & -1 & -2 \end{vmatrix} \begin{matrix} 1 & 2 \\ 1 & 3 \\ 1 & -1 \end{matrix}$$

$-6 + 4 + 3 = 1$

$-9 - 2 - 4 = -15$

$-5 - (-15) = 16$

$$D_x = \begin{vmatrix} 29 & 2 & -3 \\ 4 & 3 & 2 \\ 8 & -1 & -2 \end{vmatrix} \begin{matrix} 29 & 2 \\ 4 & 3 \\ 8 & -1 \end{matrix}$$

$-174 + 32 + 12 = -130$

$-72 - 58 - 16 = -146$

$-130 - (-146) = 16$

$$X = \frac{D_x}{D} \quad x = \frac{16}{16} \quad X = 1$$

$$3y + 2z = 3$$
$$-y - 2z = 7$$

$$2y = 10$$
$$y = 5$$

$$15 + 2z = 3$$
$$2z = -12$$
$$z = -6$$

$$1 + 5 + (-6) = 0$$

Set no. A

5.

$$2x + y = 5$$
$$2y + z = 3$$
$$3x + 2y + z = 7$$

$$D = \begin{vmatrix} 2 & 1 & 0 \\ 0 & 2 & 1 \\ 3 & 2 & 1 \end{vmatrix} \begin{matrix} 2 & 1 \\ 0 & 2 \\ 3 & 2 \end{matrix} \quad \begin{matrix} 4+3=7 \\ 4 \\ 7-4=3 \end{matrix}$$

$$Dx = \begin{vmatrix} 5 & 1 & 0 \\ 3 & 2 & 1 \\ 7 & 2 & 1 \end{vmatrix} \begin{matrix} 5 & 1 \\ 3 & 2 \\ 7 & 2 \end{matrix} \quad \begin{matrix} 10+7=17 \\ 10+3=13 \\ 17-13=4 \end{matrix}$$

$$x = \frac{4}{3}$$

$$\frac{8}{3} + y = 5$$
$$y = 5 - \frac{8}{3}$$
$$y = \frac{7}{3}$$

$$\frac{14}{3} + z = 3$$
$$y = 3 - \frac{14}{3}$$
$$y = -\frac{5}{3}$$

Letra D

6.

$$\begin{bmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ -1 & 2 & 2 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} x \\ 2x+y \\ -x+2y+2z \end{bmatrix} = \begin{bmatrix} 3 \\ 7 \\ -1 \end{bmatrix}$$

3×3 $\quad$ $3 \cdot 1$

$x = 3$

$2 \cdot 3 + y = 7$

$y = 7 - 6$

$y = 1$

$-3 + 2 + 2z = -1$

$2z = 0$

↓ Letra E.

Seg Ter Qua Qui Sex Sáb Dom

Escalonamento

1.

$$\left(\begin{array}{ccc|c} 2 & -1 & -3 & -5 \\ -2 & 3 & -1 & 11 \\ -1 & 0 & -5 & 3 \end{array}\right)$$

$0 - 1y + 7z = -11$
$0 + 3y + 4z = 8$

$-3y + 21z = -33$
$3y + 4z = 8$

$25z = -25$
$z = -1$

$3y + (-4) = 8$
$3y - 4 = 8$
$3y = 12$
$y = 4$

$2x - 4 + 3 = -5$
$2x - 1 = -5$
$2x = -4$
$x = -2$

$x = -2 ; y = 4 ; z = -1.$

2.

$x = 2y$
$2y = 3z$
$x + y + z = 11$

$3z + \frac{3}{2}z + z = 11$

$\frac{11}{2}z = 11 \quad z = \frac{11}{\frac{11}{2}}$ $z = 2$

$2y = 3.2$
$y = 3$

$x = 2.3$
$x = 6$

$6 + 6 + 6 = 18$

Letra B

3. 1 1

$x + y + z = 0$
$2x - y - 2z = 1$
$6y + 3z = -12$

$$\left(\begin{array}{ccc|c} 1 & 1 & 1 & 0 \\ 2 & -1 & -2 & 1 \\ 0 & 6 & 3 & -12 \end{array}\right) \cdot (-2) =$$

$-3y - 4z = 1$
$6y + 3z = -12$

Setro

$-6y - 8z = 2$
$6y + 3z = -12$
$-5z = -10$
$z = \frac{-10}{-5}$
$z = 2$

4.

$$\begin{aligned} x + y + z &= 68 \\ -x + y + \tfrac{z}{5} &= 0 \\ \tfrac{x}{5} - 3y + z &= 0 \end{aligned} = \left(\begin{array}{ccc|c} 1 & 1 & 1 & 68 \\ -1 & 1 & \frac{1}{5} & 0 \\ \frac{1}{5} & -3 & 1 & 0 \end{array}\right)$$

$$\begin{aligned} 0 + 2y + 1.2z &= 68 \\ 0 - 3.2y + 0.8z &= 13.6 \end{aligned}$$

$$+ \begin{cases} 6.4y + 3.84z = 217.6 \\ -6.4y + 1.60z = -27.2 \end{cases}$$

$$5.44z = 190.4$$

$$z = \frac{190.4}{5.44} \qquad z = 35$$

$$2y + 42 = 68$$

$$2y = 26$$

$$y = 13$$

$$x + 13 + 35 = 68$$

$$x = 20$$

$$2 - x = 15 \rightarrow \text{Letra A}$$

Os.

$$\begin{pmatrix} 0 & 3 & 4 & | & 134 \\ 1 & 0 & 5 & | & 115 \\ 2 & 1 & 0 & | & 48 \end{pmatrix} \quad -2$$

$0+1 \cdot -10 = -182$
$y - 10y = -182$

$3y + 4z = 134$
$y - 10z = -182$

$3y + 4z = 134$
$-3y + 30z = 546$

$34z = 680$
$z = \frac{680}{34}$
$z = 20$

$3y + 80 = 134$
$3y = 54$
$y = 18$

$2x + 18 = 48$
$2x = 30$
$x = 15$

$x + y + z$
$15 + 18 + 20 = 53$

Letra A