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Tarefa Básica

Regra de Cramer.

1-

a)

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

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

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

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

$$x = \frac{d_x}{D} \rightarrow x = \frac{3}{5}$$

$$y = \frac{d_y}{D} \rightarrow y = \frac{-4}{5}$$

$$V = \left\{\left(\frac{3}{5}, \frac{-4}{5}\right)\right\}$$

b) $\begin{cases} 3x - y + z = 1 \\ 2x + 3z = -1 \\ 4x + y - 2z = 7 \end{cases}$

$$d = \begin{vmatrix} 3 & -1 & 1 \\ 2 & 0 & 3 \\ 4 & 1 & -2 \end{vmatrix} \begin{matrix} 3 & -1 \\ 2 & 0 \\ 4 & 1 \end{matrix}$$

$0 + 9 + 4 = 13$

$0 - 12 + 2 = -10$

$\rightarrow -10 - 13 = -23$

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$0+3-2=1$

$dx=\begin{vmatrix} 1 & -1 & 1 \\ -1 & 0 & 3 \\ 7 & 1 & -2 \end{vmatrix}\begin{matrix} 1 & -1 \\ -1 & 0 \\ 7 & 1 \end{matrix} \rightarrow -22-1=-23$

$0-21-1=-22$

$-4+63-4=55$

$dy=\begin{vmatrix} 3 & 1 & 1 \\ 2 & -1 & 3 \\ 4 & 7 & -2 \end{vmatrix}\begin{matrix} 3 & 1 \\ 2 & -1 \\ 4 & 7 \end{matrix} \rightarrow 32-55=-23$

$6+12+14=32$

$0-3-14=-17$

$dz=\begin{vmatrix} 3 & -1 & 1 \\ 2 & 0 & -1 \\ 4 & 1 & 7 \end{vmatrix}\begin{matrix} 3 & -1 \\ 2 & 0 \\ 4 & 1 \end{matrix} \rightarrow 6-(-17)=23$

$0+4+2=6$

$x=\frac{dx}{d} \rightarrow x=\frac{-23}{-23}=1$ $\quad z=\frac{dz}{d} \rightarrow z=\frac{23}{-23}=-1$

$y=\frac{dy}{d} \rightarrow y=\frac{-23}{-23}=1$ $\quad V=\{(1,1,-1)\}$

2-

$\begin{cases} 3x+4y-z=1 \\ 4x+5y+2z=12 \\ x-2y+3z=8 \end{cases}$

$-5-12+48=31$

$d=\begin{vmatrix} 3 & 4 & -1 \\ 4 & 5 & 2 \\ 1 & -2 & 3 \end{vmatrix}\begin{matrix} 3 & 4 \\ 4 & 5 \\ 1 & -2 \end{matrix} \rightarrow 61-31=30$

$45+8+8=61$

$-12+48+12=48$

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

$108+2-32=78$

$y=\frac{dy}{d} \rightarrow y=\frac{30}{30}=1$

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

$d = \begin{vmatrix} 1 & 2 & 1 \\ 3 & 1 & -11 \\ 2 & 3 & -1 \end{vmatrix}$ $\begin{matrix} 1 & 2 \\ 3 & 1 \\ 2 & 3 \end{matrix}$

$2-33-6=-37$

$-1-44+9=-36$

$-36+37=1$

$d_x = \begin{vmatrix} 1 & 2 & 1 \\ -2 & 1 & -11 \\ 1 & 3 & -1 \end{vmatrix}$ $\begin{matrix} 1 & 2 \\ -2 & 1 \\ 1 & 3 \end{matrix}$

$1-33+4=-28$

$-1-22-6=-29$

$-29+28=-1$

$d_y = \begin{vmatrix} 1 & 1 & 1 \\ 3 & -2 & -11 \\ 2 & 1 & -1 \end{vmatrix}$ $\begin{matrix} 1 & 1 \\ 3 & -2 \\ 2 & 1 \end{matrix}$

$-4-11-3=-18$

$2-22+3=-17$

$-17+18=1$

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

$2-6+6=2$

$1-8+9=2$

$2-2=0$

$x = \frac{dx}{d} \rightarrow x = \frac{-1}{1} = -1$

$y = \frac{dy}{d} \rightarrow y = \frac{1}{1} = 1$

$z = \frac{dz}{d} \rightarrow z = \frac{0}{1} = 0$

SOMA $= -1+1+0$

SOMA $= 0$

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4- $\begin{cases} x+2y-3z=29 \\ x+3y+2z=4 \\ x-y-2z=8 \end{cases}$

$-9-2-4=-15$

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

$-6+4+3=1$

$-72-58-16=-146$

$$dx=\begin{vmatrix} 29 & 2 & -3 \\ 4 & 3 & 2 \\ 8 & -1 & -2 \end{vmatrix}\begin{matrix} 29 & 2 \\ 4 & 3 \\ 8 & -1 \end{matrix} \rightarrow -130-(-146)=16$$

$-174+32+12=-130$

$-12+16-58=-54$

$$dy=\begin{vmatrix} 1 & 29 & -3 \\ 1 & 4 & 2 \\ 1 & 8 & -2 \end{vmatrix}\begin{matrix} 1 & 29 \\ 1 & 4 \\ 1 & 8 \end{matrix} \rightarrow 26-(-54)=80$$

$-8+58-24=26$

$87-4+16=99$

$$dz=\begin{vmatrix} 1 & 2 & 29 \\ 1 & 3 & 4 \\ 1 & -1 & 8 \end{vmatrix}\begin{matrix} 1 & 2 \\ 1 & 3 \\ 1 & -1 \end{matrix} \rightarrow 3-99=-96$$

$24+8-29=3$

$x=\frac{dx}{d} \rightarrow x=\frac{16}{16}=1$

$y=\frac{dy}{d} \rightarrow y=\frac{80}{16}=5$

$z=\frac{dz}{d} \rightarrow z=\frac{-96}{16}=-6$

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

SOMA $=0$

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5-

$$\begin{cases} 2x+y=5 \\ 2y+z=3 \\ 3x+2y+z=7 \end{cases}$$

$$d=\begin{vmatrix} 2 & 1 & 0 \\ 0 & 2 & 1 \\ 3 & 2 & 1 \end{vmatrix}\begin{matrix} 2 & 1 \\ 0 & 2 \\ 3 & 2 \end{matrix}$$

$0+4+0=4$

$4+3+0=7$

$7-4=3$

$$dx=\begin{vmatrix} 5 & 1 & 0 \\ 3 & 2 & 1 \\ 7 & 2 & 1 \end{vmatrix}\begin{matrix} 5 & 1 \\ 3 & 2 \\ 7 & 2 \end{matrix}$$

$0+10+3=13$

$10+7+0=17$

$17-13=4$

$$dy=\begin{vmatrix} 2 & 5 & 0 \\ 0 & 3 & 1 \\ 3 & 7 & 1 \end{vmatrix}\begin{matrix} 2 & 5 \\ 0 & 3 \\ 3 & 7 \end{matrix}$$

$0+14+0=14$

$6+15+0=21$

$21-14=7$

$$dz=\begin{vmatrix} 2 & 1 & 5 \\ 0 & 2 & 3 \\ 3 & 2 & 7 \end{vmatrix}\begin{matrix} 2 & 1 \\ 0 & 2 \\ 3 & 2 \end{matrix}$$

$30+12+0=42$

$28+9+0=37$

$37-42=-5$

$$x=\frac{dx}{d} \rightarrow x=\frac{4}{3}$$

$$y=\frac{dy}{d} \rightarrow y=\frac{7}{3}$$

$$z=\frac{dz}{d} \rightarrow z=\frac{-5}{3}$$

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6-

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

$$\begin{vmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ -1 & 2 & 2 \end{vmatrix} \quad \begin{matrix} 1x & 0 & 0 \\ 2x & 1y & 0 \\ -1x & 2y & 2z \end{matrix}$$

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

$$d = \begin{vmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ -1 & 2 & 2 \end{vmatrix} \rightarrow d = 1.1.2 = 2$$

$$dx = \begin{vmatrix} 3 & 0 & 0 \\ 7 & 1 & 0 \\ -1 & 2 & 2 \end{vmatrix} \rightarrow dx = 3.1.2 = 6$$

$$0+0+12 = 12$$

$$dy = \begin{vmatrix} 1 & 3 & 0 \\ 2 & 7 & 0 \\ -1 & -1 & 2 \end{vmatrix} \begin{matrix} 1 & 3 \\ 2 & 7 \\ -1 & -1 \end{matrix} \rightarrow dy = 14 - 12 = 2$$

$$14+0+0 = 14$$

$$-3+14+0 = 11$$

$$dz = \begin{vmatrix} 1 & 0 & 3 \\ 2 & 1 & 7 \\ -1 & 2 & -1 \end{vmatrix} \begin{matrix} 1 & 0 \\ 2 & 1 \\ -1 & 2 \end{matrix} \rightarrow dz = 11 - 11 = 0$$

$$-1+0+12 = 11$$

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$$x = \frac{dx}{d} \rightarrow x = \frac{6}{2} = 3$$

$$y = \frac{dy}{d} \rightarrow y = \frac{2}{2} = 1$$

$$z = \frac{dz}{d} \rightarrow z = \frac{0}{2} = 0$$

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