DOM SEG TER QUA QUI SEX SÁB

Regra de Cramer

Tarefa Básica

1- a) $\begin{cases} 2x - y = 2 \\ -x + 3y = -3 \end{cases}$ $V = \left\{\left(\frac{3}{5}, \frac{-4}{5}\right)\right\}$

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

$D = 5$ $D_x = 3$ $D_y = -4$

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

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

$D = \begin{vmatrix} 3 & -1 & 1 \\ 2 & 0 & 3 \\ 4 & 1 & -2 \end{vmatrix}$ $D = -23$

$D_x = \begin{vmatrix} 1 & -1 & 1 \\ -1 & 0 & 3 \\ 7 & 1 & -2 \end{vmatrix}$ $D_x = -23$

$D_y = \begin{vmatrix} 3 & 1 & 1 \\ 2 & -1 & 3 \\ 4 & 7 & -2 \end{vmatrix}$ $D = -23$

$D_z = \begin{vmatrix} 3 & -1 & 1 \\ 2 & 0 & -1 \\ 4 & 1 & 7 \end{vmatrix}$

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

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

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

$D = \begin{vmatrix} 3 & 4 & -1 \\ 4 & 5 & 2 \\ 1 & -2 & 3 \end{vmatrix} \begin{matrix} 3 & 4 \\ 4 & 5 \\ 1 & -2 \end{matrix}$

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

$45 \quad 8 \quad 8 = 61$

$D = 30$

$D_y = \begin{vmatrix} 3 & 1 & -1 \\ 4 & 12 & 2 \\ 1 & 8 & 3 \end{vmatrix} \begin{matrix} 3 & 1 \\ 4 & 12 \\ 1 & 8 \end{matrix}$

$-12 \quad 48 \quad 12 = 48$

$108 \quad 2 \quad -32 = 78$

$D_y = 30$

$y = \frac{30}{30}$ $y = 1$ (A)

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

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

$2 \quad -33 \quad -6 = 37$

$-1 \quad -44 \quad 9 = 36$

$D = 1$

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

$1 \quad -33 \quad 4 = 28$

$-1 \quad -22 \quad -6 = -29$

$D = -1$

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

$-4 \quad -11 \quad -3 = -18$

$2 \quad -22 \quad 3 = 17$

$D = 1$

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

$2 \quad -6 \quad 6 = 2$

$1 \quad -8 \quad 9 = 2$

$D_z = 0$

$x = -1 \quad y = 1 \quad z = 0$

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

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

$-6 \quad 4 \quad 3 = 1$

$D = 16$

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

$-174 \quad 32 \quad 12 = -130$

$D_x = 16$

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

$-8 \quad 58 \quad -24 = 26$

$D_y = 80$

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

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

$D_z = -96$

$x = 1 \quad y = 5 \quad z = -6$

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

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

$V = \left\{ \left(\frac{4}{3}, \frac{7}{3}, \frac{-5}{3} \right) \right\}$ (D)

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

$4 \quad 3 \quad 0$

$D = 3$

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

$10 \quad 7 \quad 0$

$D_x = 6$

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

$6 \quad 15 \quad 0$

$D_y = 7$

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

$28 \quad 9 \quad 0$

$D_z = -$

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

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

$D = \begin{vmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ -1 & 2 & 2 \end{vmatrix} \begin{matrix} 1 & 0 \\ 2 & 1 \\ -1 & 2 \end{matrix}$ (0 0 0)

(2 0 0)

$D = 2$

$D_y = \begin{vmatrix} 1 & 3 & 0 \\ 2 & 7 & 0 \\ -1 & -1 & 2 \end{vmatrix} \begin{matrix} 1 & 3 \\ 2 & 7 \\ -1 & -1 \end{matrix}$ (0 0 12)

(14 0 0)

$D_y = 2$

$D_z = \begin{vmatrix} 1 & 0 & 3 \\ 2 & 1 & 7 \\ -1 & 2 & -1 \end{vmatrix} \begin{matrix} 1 & 0 \\ 2 & 1 \\ -1 & 2 \end{matrix}$ (-3 14 0)

(-1 0 12)

$D_z = 0$

$x = 3$

$y = 1$

$z = 0$

(E)

Escalonamento

Tarefa Básica

1- $\begin{cases} 2x - y - 3z = -5 \\ x + 3y - z = 11 \\ x - 5z = 3 \end{cases}$ $x = 2 \quad y = 4 \quad z = -1$

-1	-2	1	3	-1	11		
		2	-1	-3	-5	->	
		1	0	-5	3		

-7	0	-3	-4	-8			

0	0	25	25				

$x + 3.4 - 1.(-1) = 11$ $\quad -7y - 1z = -27$

$x = 13 - 11 \quad 25z = -25 \quad -7y - 1 = -27$

$x = 2 \quad z = -1 \quad y = 4$

2- $\begin{cases} x - 2y = 0 \\ 2y - 3z = 0 \\ x + y + z = 11 \end{cases}$ (B)

-1	0	1	-2	0	0		
		0	2	-3	0	->	
		1	1	1	11		

0	0	-11	-22				

$-11z = -22 \quad 2y - 3.2 = 0 \quad x - 2.3 = 0$

$z = 2 \quad y = 3 \quad x = 6$

$6 + 2.3 + 3.2 = 18$ (B)

5- $\begin{bmatrix} 0 & 3 & 4 \\ 1 & 0 & 5 \\ 2 & 1 & 0 \end{bmatrix} = \begin{bmatrix} 134 \\ 115 \\ 48 \end{bmatrix}$ (A)

$$\begin{cases} 3y + 4z = 134 \\ x + 5z = 115 \\ 2x + 1y = 48 \end{cases}$$

$D = \begin{vmatrix} 0 & 3 & 4 \\ 1 & 0 & 5 \\ 2 & 1 & 0 \end{vmatrix} \begin{matrix} 0 & 3 \\ 1 & 0 \\ 2 & 1 \end{matrix}$

$0 \quad 30 \quad 4$

$D = 34$

$D_x = \begin{vmatrix} 134 & 3 & 4 \\ 115 & 0 & 5 \\ 48 & 1 & 0 \end{vmatrix} \begin{matrix} 134 & 3 \\ 115 & 0 \\ 48 & 1 \end{matrix}$

$0 \quad 720 \quad 460$

$D_x = 510$

$D_y = \begin{vmatrix} 0 & 134 & 4 \\ 1 & 115 & 5 \\ 2 & 48 & 0 \end{vmatrix} \begin{matrix} 0 & 134 \\ 1 & 115 \\ 2 & 48 \end{matrix}$

$1340 \quad 192$

$D_y = 612$

$D_z = \begin{vmatrix} 0 & 3 & 134 \\ 1 & 0 & 115 \\ 2 & 1 & 48 \end{vmatrix} \begin{matrix} 0 & 3 \\ 1 & 0 \\ 2 & 1 \end{matrix}$

$0 \quad 690 \quad 134$

$D_z = 680$

$x = \frac{510}{34}$ $\quad y = \frac{612}{34}$ $\quad z = \frac{680}{34}$

$x = 15$ $\quad y = 18$ $\quad z = 10$

Total = 53 (A)

5- $\begin{bmatrix} 0 & 3 & 4 \\ 1 & 0 & 5 \\ 2 & 1 & 0 \end{bmatrix} = \begin{bmatrix} 134 \\ 115 \\ 48 \end{bmatrix}$ (A)

$$\begin{cases} 3y + 4z = 134 \\ x + 5z = 115 \\ 2x + 1y = 48 \end{cases}$$

$D = \begin{vmatrix} 0 & 3 & 4 \\ 1 & 0 & 5 \\ 2 & 1 & 0 \end{vmatrix} \begin{matrix} 0 & 3 \\ 1 & 0 \\ 2 & 1 \end{matrix}$

$0 \quad 30 \quad 4$

$D = 34$

$D_x = \begin{vmatrix} 134 & 3 & 4 \\ 115 & 0 & 5 \\ 48 & 1 & 0 \end{vmatrix} \begin{matrix} 0 & 690 & 0 \\ 134 & 3 & \\ 115 & 0 & \\ 48 & 1 & \end{matrix}$

$0 \quad 720 \quad 460$

$D_x = 510$

$D_y = \begin{vmatrix} 0 & 134 & 4 \\ 1 & 115 & 5 \\ 2 & 48 & 0 \end{vmatrix} \begin{matrix} 920 & 0 \\ 0 & 134 \\ 1 & 115 \\ 2 & 48 \end{matrix}$

$1340 \quad 192$

$D_y = 612$

$D_z = \begin{vmatrix} 0 & 3 & 134 \\ 1 & 0 & 115 \\ 2 & 1 & 48 \end{vmatrix} \begin{matrix} 0 & 0 & 144 \\ 0 & 3 & \\ 1 & 0 & \\ 2 & 1 & \end{matrix}$

$0 \quad 690 \quad 134$

$D_z = 680$

$x = \frac{510}{34} \qquad y = \frac{612}{34} \qquad z = \frac{680}{34}$

$x = 15 \qquad y = 18 \qquad z = 10$

Total = 53 (A)