Tarefa básica -

Regra de cramer

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

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

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

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

$D = \begin{vmatrix} 3 & -1 & 1 \\ 2 & 0 & 3 \\ 4 & 1 & -2 \end{vmatrix}$ $D = -23$ $\quad D_x = \begin{vmatrix} 1 & -1 & 1 \\ -1 & 0 & 3 \\ 7 & 1 & -2 \end{vmatrix}$ $D_x = -23$

$D_y = \begin{vmatrix} 3 & 1 & 1 \\ 2 & -1 & 3 \\ 4 & 7 & -2 \end{vmatrix}$ $D = -23$ $\quad D_z = \begin{vmatrix} 3 & -1 & 1 \\ 2 & 0 & -1 \\ 4 & 1 & 7 \end{vmatrix}$ $D_z = 23$

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

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

21 $\begin{cases} 3x+4y-3=1 \\ 4x+5y+23=12 \\ x-2y+33=8 \end{cases}$

$D=\begin{vmatrix} 3 & 4 & -1 \\ 4 & 5 & 2 \\ 1 & -2 & 3 \end{vmatrix}$ $\begin{matrix} 3 & 4 \\ 4 & 5 \\ 1 & -2 \end{matrix}$ $-5 \quad -12 \quad 48 =$

$45 \quad 8 \quad 8 = 61$

$D = 30$

$D_y=\begin{vmatrix} 3 & x & -1 \\ 4 & 12 & 2 \\ 1 & 8 & 3 \end{vmatrix}$ $\begin{matrix} 3 & 1 \\ 4 & 12 \\ 1 & 8 \end{matrix}$ $-12 \quad 48 \quad 12 = 48$

$108 \quad 2 - 32 = 78$

$D_y = 30$

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

31 $\begin{cases} x+2y+z=1 \\ 3x+y-11z=-2 \\ 2x+3y-z=1 \end{cases}$

$D=\begin{vmatrix} 1 & 2 & 1 \\ 3 & 1 & -11 \\ 2 & 3 & -1 \end{vmatrix}$ $\begin{matrix} 1 & 2 \\ 3 & 1 \\ 2 & 3 \end{matrix}$ $2 \quad -33 \quad -6 = 37$

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

$D = 1$

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

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

$D_z = 0$

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

(C)

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

$D = \begin{vmatrix} 1 & 2 & -3 \\ 1 & 3 & 2 \\ 1 & -1 & -2 \end{vmatrix}$ $\begin{matrix} 1 & 2 \\ 1 & 3 \\ 1 & -1 \end{matrix}$ $-9 \quad -2 \quad -4 = -15$

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

$D = 16$

$D_x = \begin{vmatrix} 29 & 2 & -3 \\ 4 & 3 & 2 \\ 8 & -1 & -2 \end{vmatrix}$ $\begin{matrix} 29 & 2 \\ 4 & 3 \\ 8 & -1 \end{matrix}$ $-72 \quad -58 \quad -16$

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

$D_x = 16$

$D_y = \begin{vmatrix} 1 & 29 & -3 \\ 1 & 4 & 2 \\ 1 & 8 & -2 \end{vmatrix}$ $\begin{matrix} 1 & 29 \\ 1 & 4 \\ 1 & 8 \end{matrix}$ $-12 \quad 16 \quad -58 = -54$

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

$D_y = 80$

$D_z = \begin{vmatrix} 1 & 2 & 29 \\ 1 & 3 & 4 \\ 1 & 1 & 8 \end{vmatrix}$ $\begin{matrix} 1 & 2 \\ 1 & 3 \\ 1 & 1 \end{matrix}$ $87 \quad -4 \quad 16 = 99$

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

$D_z = -96$

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

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

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

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

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

$4 \quad 3 \quad 0 \quad D = 3$

$D_x = \begin{vmatrix} 5 & 1 & 0 \\ 3 & 2 & 1 \\ 7 & 2 & 1 \end{vmatrix}$ $\begin{matrix} 5 & 1 \\ 3 & 2 \\ 7 & 2 \end{matrix}$ $0 \quad 10 \quad 3$

$-10 \quad 7 \quad 0 \quad D_x = 4$

$D_y =$ | 2 5 0 | 2 5 | 0 14 0

| 0 3 1 | 0 3 |

| 3 7 1 | 3 7 | 6 15 0

$D_y = 7$

$D_z =$ | 2 1 5 | 2 1 | 30 10 0

| 0 2 3 | 0 2 |

| 3 2 7 | 3 2 | 28 9 0

$D_z = -5$

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 | → 3 | 0 -7 -1 | -27

| 1 0 -5 | 3 | -7 | 0 -3 -4 | -8

| | | $x + 3 \cdot 4 - 1 \cdot (-1) = 11$ | $-7y - 1z = -27$

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

| 0 0 25 | 25 | $x = 2$ | $z = -1$ | $y = 4$

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

-1	0	1	-2	0	0						
		0	2	-3	0	→ 3	0	2	-3	0	
		1	1	1	11	-2	0	3	1	11	0 0 -11 -22

$-11z=-22$ $\quad 2y-3\cdot 2=0$ $\quad x-2\cdot 3=0$

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

$6+2\cdot 3+3\cdot 2=18$ (B)

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

0	-2	1	1	1	0						
		2	-1	-2	1	→ 6	0	-3	-4	1	
		0	6	3	-12	3	0	6	3	-12	0 0 -15 30

$-15z=30$

$z=2$ (D)

4) $\begin{cases} a+b+c=68 \\ 5a-5b-c=0 \\ a-15b+5c=0 \end{cases}$

$D = \begin{vmatrix} 1 & 1 & 1 \\ 5 & -5 & -1 \\ 1 & -15 & 5 \end{vmatrix} \begin{matrix} 1 & 1 \\ 5 & -5 \\ 1 & -15 \end{matrix}$

$-5 \quad -15 \quad 25 = 35$

$-25 \quad -1 \quad -75 = 101$

$D = 136$

$Da = \begin{vmatrix} 68 & 1 & 1 \\ 0 & -5 & -1 \\ 0 & -15 & 5 \end{vmatrix} \begin{matrix} 68 & 1 \\ 0 & -5 \\ 0 & -15 \end{matrix}$

$0 \quad 20 \quad 20$

-1700

$Da = 2720$

$Db = \begin{vmatrix} 1 & 68 & 1 \\ 5 & 0 & -1 \\ 1 & 0 & 5 \end{vmatrix} \begin{matrix} 1 & 68 \\ 5 & 0 \\ 1 & 0 \end{matrix}$

$0 \quad 0 \quad 1700$

$0 \quad -68 \quad 0$

$Db = 1768$

$Dc = \begin{vmatrix} 1 & 1 & 68 \\ 5 & -5 & 0 \\ 1 & -15 & 0 \end{vmatrix} \begin{matrix} 1 & 1 \\ 5 & -5 \\ 1 & -15 \end{matrix}$

$-340 \quad 0 \quad 0$

$0 \quad 0 \quad -5100$

$Dc = 4760$

$a = \frac{2720}{136} = 20 \quad | \quad b = \frac{1768}{136} = 13 \quad | \quad c = \frac{4760}{136} = 35$

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

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

$D = \begin{vmatrix} 0 & 3 & 4 \\ 1 & 0 & 5 \\ 2 & 1 & 0 \end{vmatrix} \begin{matrix} 0 & 3 \\ 1 & 0 \\ 2 & 1 \end{matrix}$ $\quad 0 + 30 - 4$

$D = 34$

$Dx = \begin{vmatrix} 134 & 3 & 4 \\ 115 & 0 & 5 \\ 48 & 1 & 0 \end{vmatrix} \begin{matrix} 134 & 3 \\ 115 & 0 \\ 48 & 1 \end{matrix}$ $\quad 0 + 720 - 460$

$Dx = 510$

$Dy = \begin{vmatrix} 0 & 134 & 4 \\ 1 & 115 & 5 \\ 2 & 48 & 0 \end{vmatrix} \begin{matrix} 0 & 134 \\ 1 & 115 \\ 2 & 48 \end{matrix}$ $\quad 1340 - 192$

$Dy = 612$

$Dz = \begin{vmatrix} 0 & 3 & 134 \\ 1 & 0 & 115 \\ 2 & 1 & 48 \end{vmatrix} \begin{matrix} 0 & 3 \\ 1 & 0 \\ 2 & 1 \end{matrix}$ $\quad 0 + 690 - 134$

$Dz = 680$

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

$x = 15 \qquad y = 18 \qquad z = 20$

$t = 53$ (A)