

## Tarefa Básica

Primeira parte - Regra de Cramer

$$1) a) \begin{cases} 2x - y = 2 \\ -x + 3y = 3 \end{cases}$$

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

$$\det x = \begin{vmatrix} 2 & -1 \\ -3 & 3 \end{vmatrix} = -6 - 3 = -9$$

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

$$x = \frac{\det x}{\det} = \frac{-9}{5}$$

$$y = \frac{\det y}{\det} = \frac{-4}{5}$$

$$V = \left\{ \left( \frac{-9}{5}, \frac{-4}{5} \right) \right\}$$

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

$$0 + 9 + 4 = 13$$

$$\det = \begin{vmatrix} 3 & -1 & 1 & 3 & -1 \\ 2 & 0 & 3 & 2 & 0 \\ 4 & 1 & -2 & 4 & 1 \end{vmatrix} = -10 - (-13) = -23$$

$$0 + 12 + 2 = -10$$

$$\det x = \begin{vmatrix} 1 & -1 & 1 & 1 & 1 \\ -1 & 0 & 3 & -1 & 0 \\ 7 & 1 & -2 & 7 & 1 \end{vmatrix} = -22 - 1 = -23$$

$$0 - 21 - 1 = -22$$

$$-4 - 63 - 4 = -55$$

$$\det y = \begin{vmatrix} 3 & 1 & 1 & 3 & 1 \\ 2 & -1 & 3 & 2 & -1 \\ 4 & 7 & -2 & 4 & 7 \end{vmatrix} = 32 - 55 = -23$$

$$6 + 12 + 14 = 32$$

$$-3 - 14 = -17$$

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

$$0 + 4 + 2 = 6$$

$$x = \frac{dx}{dz} = \frac{-23}{-23} = 1$$

$$y = \frac{dy}{dz} = \frac{-23}{-23} = 1$$

$$z = \frac{dz}{dz} = \frac{23}{-23} = -1$$

$$V = \{(1, 1, -1)\}$$



$$2) y = ?$$

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

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

$$45 + 88 = 61$$

$$-12 + 48 + 12 = 48$$

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

$$1082 - 35 = 78$$

$$y = \frac{\det y}{\det} = \frac{30}{30} = 1 \quad \text{detra A}$$

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

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

$$12 = 1$$

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

$$12x = -1$$

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

$$12y = 1$$

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

$$12z = 0$$

$$A + B + C = 0 - 1 + 1 = 0$$

$$x = \frac{-1}{12} = -1$$

$$y = \frac{1}{12} = 1$$

$$z = \frac{0}{12} = 0$$

detra C

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

$$\det = \begin{vmatrix} 1 & 2 & -3 & 1 & 2 \\ 1 & 3 & 2 & 1 & 3 \\ 1 & -1 & -2 & 1 & 1 \end{vmatrix} = 13 - (-15) = 28$$
  

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

$$6 + 4 + 3 = 13$$
  

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

$$\det x = \begin{vmatrix} 29 & 2 & -3 & 29 & 2 \\ 4 & 3 & 2 & 4 & 3 \\ 8 & -1 & -2 & 8 & 1 \end{vmatrix} = 130 - (-146) = 276$$
  

$$-174 - 32 = -206$$
  

$$-12 \cdot 16 - 58 = -130$$

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

$$-8 \cdot 58 - 29 = -54$$
  

$$87 - 4 \cdot 16 = 99$$

$$\det z = \begin{vmatrix} 1 & 2 & 29 & 1 & 2 \\ 1 & 3 & 4 & 1 & 3 \\ 1 & -1 & 8 & 1 & 1 \end{vmatrix} = 3 - 99 = -96$$
  

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

$$\begin{aligned} x &= \frac{dx}{dz} = \frac{16}{28} = \frac{4}{7} \approx 0,57 \\ y &= \frac{dy}{dz} = \frac{80}{28} = \frac{20}{7} \approx 2,85 \\ z &= \frac{dz}{dz} = -\frac{96}{28} = -\frac{24}{7} \approx -3,42 \end{aligned}$$
  

$$x + y + z = 0,57 + 2,85 + (-3,42) = 0$$
  

o letra A



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

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

$0 \cdot 4 \cdot 0 = 4$   
 $2 = 7 - 4 =$   
 $4 + 3 + 0 = 7$   
 $0 + 10 + 3 = 13$

$$\det x = \begin{vmatrix} 5 & 1 & 0 & 5 & 1 \\ 3 & 2 & 1 & 3 & 2 \\ 7 & 2 & 1 & 7 & 2 \end{vmatrix}$$

$2 = 17 - 13 = 4$   
 $10 + 7 + 0 = 17$   
 $0 + 14 + 0 = 14$

$$\det y = \begin{vmatrix} 2 & 5 & 0 & 2 & 5 \\ 0 & 2 & 1 & 0 & 3 \\ 3 & 7 & 1 & 3 & 7 \end{vmatrix}$$

$3 = 21 - 14 = 7$   
 $6 + 15 + 0 = 21$

$$\det z = \begin{vmatrix} 2 & 1 & 5 & 2 & 1 \\ 0 & 2 & 3 & 0 & 2 \\ 3 & 2 & 7 & 3 & 2 \end{vmatrix}$$

$30 + 12 - 0 = 42$   
 $2 = 37 - 42 = -5$   
 $28 + 9 + 0 = 37$

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

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

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

6) 
$$\begin{array}{ccc|ccc} 1 & 0 & 0 & x & 3 & 1 & 0 & 0 & x & x+0x+0z \\ 2 & 1 & 0 & y & 7 & 2 & 1 & 0 & y & 2x+y+0z \\ -1 & 2 & 2 & z & -1 & -1 & 2 & 2 & z & -x+2y+2z \end{array}$$

$$\begin{array}{ccc|ccc} x+0x+0 & & 3 & & & x=3 \\ 2x+y+0z & = & 7 & \rightarrow & 2x+y=7 \\ -x+2y+2z & & -1 & & -x+2y+2z=-1 \end{array}$$

$$m = \begin{array}{ccc|ccc} 1 & 0 & 0 & 1 & 0 & \\ 2 & 1 & 0 & 2 & 1 & 12=2 \\ -1 & 2 & 2 & -1 & 2 & \end{array}$$

$$mx = \begin{array}{ccc|ccc} 3 & 0 & 0 & 3 & 0 & \\ 7 & 1 & 0 & 7 & 1 & 12x=6 \quad x=\frac{6}{2}=3 \\ -1 & 2 & 2 & -1 & 2 & \end{array}$$

$$mx = \begin{array}{ccc|ccc} 1 & 3 & 0 & 1 & 3 & \\ 2 & 7 & 0 & 2 & 7 & 12x=2 \quad x=\frac{2}{2}=1 \\ -1 & -1 & 2 & -1 & -1 & \end{array}$$

$$mz = \begin{array}{ccc|ccc} 1 & 0 & 3 & 1 & 0 & \\ 2 & 1 & 7 & 2 & 1 & 12=0 \quad Z=0 \\ -1 & 2 & -1 & -1 & 2 & \text{det } E \end{array}$$