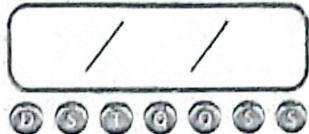


José António de Souza Martins

listo 3 //



$$\textcircled{1} \quad A = a_{ij} \times 3 \quad \left\{ \begin{array}{l} i+j, i < j \\ 2i-j, i = j \\ j-1, i > j \end{array} \right. \quad AX = B \quad \Rightarrow \quad B = \begin{pmatrix} 1 \\ 2 \\ -3 \end{pmatrix}$$

$$A = \begin{pmatrix} 2 \cdot 1 - 1 & 1+2 & 1+3 \\ 1-2 & 2 \cdot 2 - 2 & 2+3 \\ 1-3 & 2-3 & 2 \cdot 3 - 3 \end{pmatrix} = \begin{pmatrix} 1 & 3 & 4 \\ -1 & 2 & 5 \\ -2 & -1 & 3 \end{pmatrix} \quad \det A = \begin{pmatrix} 11 & -7 & 5 \\ 13 & 11 & -5 \\ -9 & 5 \end{pmatrix}$$

$$a_{11} = (-1)^2 \cdot (2 \cdot 3 - 5) = 11 \quad a_{21} = \begin{vmatrix} 3 & 4 \\ -1 & 3 \end{vmatrix} \cdot (-1)^3 = -(9 - 4) = -5 //$$

$$a_{12} = (-1)^3 \cdot \begin{vmatrix} 1 & 8 \\ -2 & 3 \end{vmatrix} = -7 \quad a_{22} = \begin{vmatrix} 1 & 4 \\ -8 & 2 \end{vmatrix} \cdot (-1)^4 = 3 - (-8) = 11 //$$

$$a_{13} = (-1)^4 \cdot \begin{vmatrix} 1 & 8 \\ -2 & 1 \end{vmatrix} = 5 \quad a_{23} = \begin{vmatrix} 1 & 4 \\ -6 & 2 \end{vmatrix} \cdot (-1)^5 = -(1 - (-6)) = -5 //$$

$$a_{31} = \begin{vmatrix} 3 & 4 \\ 2 & 5 \end{vmatrix} \cdot (-1)^4 = 15 - 8 = 7 \quad a_{32} = \begin{vmatrix} 1 & 4 \\ -4 & 1 \end{vmatrix} \cdot (-1)^5 = -(5 - (-4)) = -9$$

$$a_{33} = \begin{vmatrix} 1 & 3 \\ -3 & 2 \end{vmatrix} \cdot (-1)^6 = 2 - (-3) = 5$$

$$\text{adj } A = \begin{pmatrix} 11 & -13 & 7 \\ -7 & 11 & -9 \\ 5 & -5 & 5 \end{pmatrix} \quad \left\{ \begin{array}{l} \begin{vmatrix} 1 & 3 & 4 \\ -1 & 2 & 5 \\ -2 & -1 & 3 \end{vmatrix} = \begin{vmatrix} 1 & 3 & 4 \\ -1 & 2 & 5 \\ 0 & 5 & 11 \end{vmatrix} = \\ \begin{vmatrix} 1 & 3 & 4 \\ 0 & 5 & 9 \\ 0 & 5 & 11 \end{vmatrix} = 0 \end{array} \right. \quad =$$

$$\begin{array}{c|c|c|c|c} 1 & 0 & 0 & 1 & 0 \\ \hline 0 & 5 & 9 & 0 & 5 \\ \hline 0 & 5 & 11 & 0 & 2 \end{array} \quad \begin{array}{c|c|c|c|c} 1 & 0 & 0 & 1 & 0 \\ \hline 0 & 5 & 0 & 0 & 5 \\ \hline 0 & 0 & 2 & 0 & 0 \end{array} \quad \det A = 10, \quad A^{-1} A X = A^{-1} B \quad A^{-1} = \text{adj} \cdot \det^{-1} \quad X = A^{-1} B$$

$$X = \frac{1}{10} \cdot \begin{pmatrix} 11 & -13 & 7 \\ -7 & 11 & -9 \\ 5 & -5 & 5 \end{pmatrix} \cdot \begin{pmatrix} 1 \\ 2 \\ -3 \end{pmatrix} = \begin{pmatrix} 11 - 26 - 21 \\ -7 + 22 + 27 \\ 5 - 10 - 15 \end{pmatrix} \cdot \frac{1}{10} = \begin{pmatrix} -36/10 \\ 42/10 \\ -20/10 \end{pmatrix} = \begin{pmatrix} -3,6 \\ 4,2 \\ -2 \end{pmatrix} //$$

$$\textcircled{2} \text{ a) } \begin{pmatrix} 1 & 4 \\ 2 & 3 \end{pmatrix} X = \begin{pmatrix} 2 \\ -1 \end{pmatrix} \xrightarrow{A^{-1}} A^{-1}AX = A^{-1}B \quad X = A^{-1}B$$

$$\text{adj} = \begin{pmatrix} 3 & -2 \\ -4 & 1 \end{pmatrix} \Rightarrow \text{adj} = \begin{pmatrix} 3 & -4 \\ -2 & 1 \end{pmatrix} \quad \left| \begin{array}{cc|c} 1 & 4 & 2 \\ 2 & 3 & -1 \end{array} \right| \quad \det = -5$$

$$X = (-5)^{-1} \cdot \begin{pmatrix} 3 & -4 \\ -2 & 1 \end{pmatrix} \cdot \begin{pmatrix} 2 \\ -1 \end{pmatrix} = (-5)^{-1} \cdot \begin{pmatrix} 3 \cdot 2 + (-4 \cdot -1) \\ -4 + (-1) \end{pmatrix} = -5^{-1} \cdot \begin{pmatrix} 10 \\ -5 \end{pmatrix} = \begin{pmatrix} -2 \\ 1 \end{pmatrix}$$

$$\text{b) } \begin{pmatrix} 2 & 3 \\ 5 & 5 \end{pmatrix} + \begin{pmatrix} 1 & 2 \\ 3 & 5 \end{pmatrix} Y = \begin{pmatrix} 1 & 3 \\ 2 & 7 \end{pmatrix} \Rightarrow \begin{pmatrix} 1 & 2 \\ 3 & 5 \end{pmatrix} Y = \begin{pmatrix} 1 & 3 \\ 2 & 7 \end{pmatrix} - \begin{pmatrix} 2 & 3 \\ 5 & 5 \end{pmatrix} \Rightarrow \begin{pmatrix} 1 & 2 \\ 3 & 5 \end{pmatrix} Y = \begin{pmatrix} -1 & 0 \\ -3 & 2 \end{pmatrix}$$

$$\left| \begin{array}{cc} 1 & 2 \\ 3 & 5 \end{array} \right| = -1 \quad \text{adj} = \begin{pmatrix} 5 & -2 \\ -3 & 1 \end{pmatrix} \quad \text{inverses} = \begin{pmatrix} -5 & 2 \\ 3 & -1 \end{pmatrix} \quad A^{-1}AY = A^{-1}B \quad (Y = -5 \cdot \begin{pmatrix} -5 & 2 \\ 3 & -1 \end{pmatrix} \cdot \begin{pmatrix} -1 & 0 \\ -3 & 2 \end{pmatrix})$$

$$Y = \begin{pmatrix} -5 \cdot (-1) & -5 \cdot 2 \\ -3 + 3 & -2 \end{pmatrix} = \begin{pmatrix} 5 & -10 \\ 0 & -2 \end{pmatrix} \quad Y = \begin{pmatrix} 1 & 4 \\ 0 & -2 \end{pmatrix}$$

$$\text{c) } \begin{pmatrix} 1 & 0 & 0 \\ 2 & -1 & 0 \\ 2 & 3 & 1 \end{pmatrix} W = \begin{pmatrix} 5 \\ 7 \\ 2 \end{pmatrix} \quad AW = B \quad \left| \begin{array}{ccc|c} 1 & 0 & 0 & 5 \\ 2 & -1 & 0 & 7 \\ 2 & 3 & 1 & 2 \end{array} \right| \quad \begin{array}{l} 1 & 0 & 0 & | & 5 \\ 2 & -1 & 0 & | & 7 \\ 2 & 3 & 1 & | & 2 \end{array} \quad \det = -1$$

(of A A B)

$$a_{11} = + \begin{vmatrix} -1 & 0 \\ 3 & 1 \end{vmatrix} = -1 \quad a_{23} = - \begin{vmatrix} 1 & 0 \\ 2 & 3 \end{vmatrix} = -3 \quad W = - \begin{vmatrix} -1 & 0 & 0 \\ -2 & 1 & 0 \\ 0 & 0 & 1 \end{vmatrix} \cdot \begin{pmatrix} 5 \\ 7 \\ 2 \end{pmatrix}$$

$$a_{12} = - \begin{vmatrix} 2 & 0 \\ 2 & 1 \end{vmatrix} = -2 \quad a_{31} = + \begin{vmatrix} 0 & 0 \\ -1 & 0 \end{vmatrix} = 0 \quad W = - \begin{pmatrix} -5 \\ 8 & -3 & -1 \\ 2 \end{pmatrix}$$

$$a_{13} = + \begin{vmatrix} 2 & -1 \\ 2 & 3 \end{vmatrix} = 8 \quad a_{32} = - \begin{vmatrix} 1 & 0 \\ 2 & 0 \end{vmatrix} = 0 \quad W = - \begin{pmatrix} 10 & 7 \\ 40 & -21 & -2 \end{pmatrix} \cdot \begin{pmatrix} 5 \\ 7 \\ 2 \end{pmatrix}$$

$$a_{21} = - \begin{vmatrix} 0 & 0 \\ 3 & 1 \end{vmatrix} = 0 \quad a_{33} = \begin{vmatrix} 1 & 0 \\ 2 & -1 \end{vmatrix} = -1 \quad W = - \begin{pmatrix} -5 \\ -3 \\ 2 \end{pmatrix} = \begin{pmatrix} 5 \\ 3 \\ -17 \end{pmatrix}$$

$$a_{22} = + \begin{vmatrix} 1 & 0 \\ 2 & 1 \end{vmatrix} = 1 \quad \text{Adj} = \begin{pmatrix} -1 & 0 & 0 \\ -2 & 1 & 0 \\ 8 & -3 & -1 \end{pmatrix} \quad \left| \begin{array}{cc|c} 2 & 1 & -17 \\ 2 & 1 & -17 \end{array} \right|$$

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$$(3) \text{ a) } AXB = C \quad \text{b) } A(B+X) = A \quad \text{c) } ACXB = C$$

$$A^{-1}AXB = A^{-1}C \quad A^{-1}A(B+X) = A^{-1}A$$

$$IXB = A^{-1}C^{-1} \quad I(B+X) = I$$

$$IXI = A^{-1}C^{-1} \quad B+X = I$$

$$X = A^{-1}C^{-1} // \quad X = I - B //$$

$$IXI = C^{-1}A^{-1}CB^{-1}$$

$$X = C^{-1}A^{-1}CB^{-1} //$$

$$\text{d) } (AB)^{-1}(AX) = C \cdot C^{-1} \quad \text{e) } AB^T \times B^T = A^T$$

$$(AB)(AB)^{-1}(AX) = AB // \quad A^T AB^T \times B^T B = A^T A^T B$$

$$IX = AB$$

$$IB^T X I = A^T A^T B$$

$$X(2A-I) = 3B$$

$$A^{-1}AX = A^{-1}AB$$

$$(B^T)^{-1} B X I = B^T A^{-1} A^T B$$

$$XI = 3B/(2A-I)$$

$$X = B //$$

$$X = B^T A^{-1} A^T B$$

$$X = 3B(2A-I)^{-1} //$$

$$X = (AB)^{-1} A^T B //$$

$$(4) \text{ a) } \begin{cases} 3x - 4y = 1 \\ 2x + 6y = 18 \end{cases}$$

$$\begin{array}{|cc|} \hline 3 & -4 & 18 - (-8) \\ \hline -8 & 2 & 6 \\ \hline \end{array} = 0$$

$$\begin{cases} 5x + 8y = 34 \\ 10x + 16y = 50 \end{cases}$$

$$\begin{array}{|cc|} \hline 5 & 8 & \text{det} = 0 // \\ \hline 10 & 16 \\ \hline \end{array}$$

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

$$\begin{array}{|cc|} \hline 1 & 2 & D = -3 - 4 = -7 \\ \hline 4 & 2 & -3 \\ \hline \end{array}$$

$$\begin{array}{|cc|} \hline 34 & 8 & 9 & 0 \\ \hline 50 & 16 & 50 & 16 \\ \hline \end{array} \quad D_x = -15 - (-8)$$

$$\begin{array}{|cc|} \hline 5 & 2 & -8 & -4 & -3 \\ \hline -15 & & -15 & & \\ \hline \end{array} \quad D_x = -7$$

$$\begin{array}{|cc|} \hline 1 & -4 & 6 - (-7z) \\ \hline 72 & 18 & 6 \\ \hline \end{array} = D_x$$

$$D_x = 144$$

$$\begin{array}{|cc|} \hline 1 & 5 & 15 \\ \hline 10 & 2 & -4 \\ \hline \end{array} \quad D_y = -4 - 10$$

$$\begin{array}{|cc|} \hline 3 & 1 & 54 - z \\ \hline 2 & 18 & 5z \\ \hline \end{array} = D_y$$

$$\begin{array}{|cc|} \hline 5 & 34 & 5 & 9 \\ \hline 10 & 50 & 10 & 0 \\ \hline \end{array} \quad D_y = -90$$

$$\begin{array}{|cc|} \hline 10 & 2 & -4 \\ \hline 14 & & \\ \hline \end{array} \quad D_y = -14$$

$$x = D_x = \frac{78 - 39}{26} = 3$$

$$\begin{matrix} \text{Laterna} \\ \text{Impassível} \end{matrix}$$

$$y = \frac{-14}{-14} = 1$$

$$y = D_y = \frac{52 - 72}{26} = -2$$

$$S = \emptyset$$

$$S = \{1\} \cup \{2\}$$

$$S = \{(3)\} \cup \{(2)\}$$

1 1

1 1 1 1 1 1

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

$$\begin{array}{|ccc|c|} \hline & 3 & 2 & -5 \\ \hline & 2 & -4 & -2 \\ \hline & 1 & -2 & -3 \\ \hline \end{array} \quad \begin{array}{|ccc|c|} \hline & 3 & 2 & -5 \\ \hline & 0 & 0 & 4 \\ \hline & 1 & -2 & -3 \\ \hline \end{array} \quad \begin{array}{|ccc|c|} \hline & 1 & 2 & -1 \\ \hline & 2 & -1 & 3 \\ \hline & 3 & 3 & -2 \\ \hline \end{array} \quad D = 14 - 1$$

$$D = 10$$

$$D = 32$$

$$D = 30$$

$$\begin{array}{|ccc|c|} \hline & 8 & 2 & -5 \\ \hline & -4 & -4 & -2 \\ \hline & -4 & -2 & -3 \\ \hline \end{array} \quad \begin{array}{|ccc|c|} \hline & 8 & 2 & -5 \\ \hline & 4 & 4 & 2 \\ \hline & 4 & 2 & 3 \\ \hline \end{array} \quad \begin{array}{|ccc|c|} \hline & 1 & 2 & -1 \\ \hline & 3 & 3 & -2 \\ \hline & 0 & 3 & -2 \\ \hline \end{array} \quad \begin{array}{l} D_x = -30 - (-40) \\ D_x = 10 \end{array}$$

$$x = 10 \quad x = 10$$

$$D_x = 8 \cdot (9 - (-3))$$

$$D_x = 8 \cdot 12$$

$$D_x = 96$$

$$D_y = 4(10 - (-6))$$

$$D_y = 4 \cdot 16$$

$$D_y = 64$$

$$D_y = 48$$

$$D_y = 20 \quad y = 20 / 10 = 2$$

$$\begin{array}{|ccc|c|} \hline & 3 & 8 & -5 \\ \hline & 2 & -4 & -2 \\ \hline & 1 & -4 & -3 \\ \hline \end{array} \quad \begin{array}{|ccc|c|} \hline & 1 & 3 & -8 & 5 \\ \hline & 2 & -4 & -2 & 2 \\ \hline & 1 & -4 & -3 & 1 \\ \hline \end{array} \quad \begin{array}{|ccc|c|} \hline & 1 & 2 & 2 \\ \hline & 2 & -1 & 9 \\ \hline & 3 & 3 & 3 \\ \hline \end{array} \quad \begin{array}{l} D_y = 4(10 - (-6)) \\ D_y = 4 \cdot 16 \\ D_y = 64 \end{array}$$

$$\begin{array}{|ccc|c|} \hline & 4 & 3 & -2 \\ \hline & 2 & 1 & 2 \\ \hline & 1 & 1 & 3 \\ \hline \end{array} \quad \begin{array}{|ccc|c|} \hline & 3 & -2 & 2 & 3 & -2 \\ \hline & 2 & 1 & 0 & 2 & 1 \\ \hline & 1 & 1 & 2 & 1 & 1 \\ \hline \end{array} \quad \begin{array}{|ccc|c|} \hline & 3 & -1 & 0 & 0 \\ \hline & 0 & 0 & 1 & 0 & 0 \\ \hline & 0 & 1 & 1 & 0 & 1 \\ \hline \end{array} \quad \begin{array}{l} D_z = 0 - (-1) \\ D_z = 1 \\ D_z = 1 \end{array}$$

$$z = 30 / 10 = 3$$

$$\begin{array}{|ccc|c|} \hline & 3 & 2 & 8 \\ \hline & 2 & -4 & -4 \\ \hline & 1 & -2 & -4 \\ \hline \end{array} \quad \begin{array}{|ccc|c|} \hline & 3 & -2 & -8 \\ \hline & 2 & 4 & 4 \\ \hline & 1 & 2 & 4 \\ \hline \end{array} \quad \begin{array}{|ccc|c|} \hline & 3 & 1 & 2 & 2 & 3 & -1 \\ \hline & 0 & 0 & 1 & 0 & 0 & 0 \\ \hline & 1 & 1 & 1 & 1 & 1 & 1 \\ \hline \end{array} \quad \begin{array}{l} D_{xz} = 8 \cdot (1 - (-3)) \\ D_{xz} = 8 \cdot 4 \\ D_{xz} = 32 \end{array}$$

$$S = \left\{ \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} \right\}$$

$$\begin{array}{|ccc|c|} \hline & 2 & 4 & 3 & -1 & -2 \\ \hline & 1 & 2 & 2 & 1 & 1 \\ \hline & 1 & 1 & 1 & 1 & 1 \\ \hline \end{array} \quad \begin{array}{|ccc|c|} \hline & 8 & 3 & -1 & -2 \\ \hline & 0 & 0 & -1 & 1 \\ \hline & 1 & 1 & 1 & 1 \\ \hline \end{array} \quad \begin{array}{|ccc|c|} \hline & 8 & 3 & -1 & 0 & 3 & -1 \\ \hline & 0 & 0 & -1 & 0 & 0 & 0 \\ \hline & 1 & 1 & 1 & 1 & 1 & 1 \\ \hline \end{array}$$

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$$\text{p)} \begin{cases} x + 3z + 6 = -2 \\ 2x - 4y = -4 \\ 3x - 2y - 5z = 26 \end{cases}$$

$$4 | 1 \ 0 \ 8 \quad | \ 1 \ 0 \ 8 \quad | \ 4(-18 - 26) \quad | \ -176$$

$$1 | 1 \ 2 \quad | \ 1 \ 1 \quad | \ 4(44) \quad | \ z = \frac{-176}{44} = -4$$

$$3 | 1 -26 \quad | \ 3 \ 1 \quad | \ D_z = -176$$

$$\begin{cases} x + 0y + 3z = -8 \\ 2x - 4y + 0z = -4 \\ 3x - 2y - 5z = 26 \end{cases}$$

$$24 + 2 \quad -26 + 8 \quad | \ g) \begin{cases} x + 2y + 3z = 10 \\ 3x + 4y + 6z = 23 \\ 3x + 2y + 3z = 10 \end{cases}$$

$$S = \begin{pmatrix} 4 \\ 3 \\ -4 \end{pmatrix} \quad | \quad \text{det} = 1$$

$$1 | 0 \ 3 \quad | \ 2 \ 1 \ 0 \ 3 \quad | \ 1 \ 2 \ 3 \quad | \ 1 \ 0 \ 0 \quad | \ 1 \ 0 \ 3 \ 1 0$$

$$2 | -4 \ 0 \quad | \ 2 \ -2 \ 0 \quad | \ 3 \ 4 \ 6 \quad | \ 3 \ 0 \ 0 \quad | \ 0 \ 0 \ 0 \ 0 0$$

$$3 | -2 \ -5 \quad | \ 3 \ -1 \ -5 \quad | \ 3 \ 2 \ 3 \quad | \ 3 \ 2 \ 3 \quad | \ 0 \ 2 \ 3 \ 0 2$$

$$-4 | 1 \ 0 \ 3 \quad | \ 0 \ 0 \quad | \ 10 \ 2 \ 3 \quad | \ 2 \cdot 3 \quad | \ 10 \ 1 \ 1 \quad | \ D_x = 0$$

$$1 | 1 \ -1 \ 0 \quad | \ 1 \ 1 \ 0 \quad | \ 23 \ 4 \ 6 \quad | \ 23 \ 2 \ 2 \quad | \ 0 \ 0 \ 0 \quad | \ D_y = 0$$

$$3 | 1 \ -5 \ 3 \quad | \ 0 \ 2 \ 3 \quad | \ 10 \ 1 \ 1 \quad | \ 0 \ 0 \ 0 \quad | \ 0 \ 0 \ 0 \quad | \ D_z = 0$$

$$q) \quad -5 + 3 \quad | \quad 2 \ 10 \ 3 \quad | \ 1 \ 10 \ 3 \quad | \ 0 \ 0 \ 3$$

$$-8 \ 0 \ 3 | -8 \ 0 \ 3 \quad | \ D_x = 4(-40 - 184) \quad | \ 3 \ 23 \ 6 \quad | \ 0 \ 13 \ 3 \quad | \ 0 \ 3 \ 0$$

$$-4 \ -4 \ 0 = 4 \ -4 \ 0 \quad | \ D_x = 4(44) \quad | \ 3 \ 10 \ 3 \quad | \ 2 \ 0 \ 0 \quad | \ 2 \ 0 \ 0$$

$$26 \ -2 \ -5 | 26 \ 2.5 \quad | \ x = 4 \quad | \ 0 \ 0 \ 3 \quad | \ 0 \ 0 \ 0 \quad | \ \text{det} = -18$$

$$4 | -8 \ 0 \ 3 \quad | \ -8 \ 0 \ 3 \quad | \ 0 \ 3 \ 0 \quad | \ 0 \ 0 \ 3 \quad | \ y$$

$$1 | -1 \ 0 \quad | \ 1 \ -1 \ 0 \quad | \ 2 \ 0 \ 0 \quad | \ 0 \ 0 \ 0 \quad | \ 0$$

$$26 \ 2 \ -5 | 28 \ 0 \ -5 \quad | \ 1 \ 2 \ 10 \quad | \ 1 \ 2 \ 10$$

$$-84 \quad -40 \quad | \quad 3 \ 4 \ 23 \quad | \ 3 \ 4 \ 23$$

$$1 | -8 \ 3 \quad | \ 1 \ -4 \ 3 \quad | \ 3 \ 2 \ 10 \quad | \ 5 \ -2 \ 0 \ 0$$

$$2 | -4 \ 0 \quad | \ 2 \ -2 \ 0 \quad | \ 0 \ 2 \ 10 \quad | \ 0 \ 2 \ 0 \ 5 \ 2$$

$$3 | 26 \ 5 \quad | \ 3 \ 13 \ -5 \quad | \ 0 \ 4 \ 23 \quad | \ 0 \ 0 \ 3 \quad | \ 0 \ 0 \ 3 \ 0 \ 0$$

$$4 | 1 \ -4 \ 3 \quad | \ 1 \ -4 \quad | \ D_y = 4(44 - 11) \quad | \ 2 \ 0 \ 0 \quad | \ 2 \ 0 \ 6 \ 2 \ 0$$

$$1 | -1 \ 0 \quad | \ 1 \ -1 \quad | \ D_y = 4 \cdot 33 = 132 \quad | \ D_z = 12 \quad | \ 12$$

$$3 | 13 \ 5 \ 3 \ 13 \quad | \ y = 13^2 / 44 = 3 \quad | \ \text{Sistema impossível}$$

$$-9 + 0 + 20 \quad | \quad 5 + 39 \quad | \quad D_y = -18 \quad | \quad 0$$

$$1 | 0 \ -8 \quad | \ 2 \ 1 \ 0 \ 8 \quad | \ 4 \ 1 \ 0 \ 8$$

$$2 | -4 \ -4 \quad | \ 1 \ 2 \ 2 \quad | \ 1 \ 1 \ 2$$

$$3 | -2 \ 26 \quad | \ 3 \ 2 \ -26 \quad | \ 3 \ 1 \ 26$$

$$S = \emptyset$$

$$\text{Sistemas de Equações Lineares}$$

a) $\begin{cases} 3x_1 - 4x_2 = 0 \\ -6x_1 + 8x_2 = 0 \end{cases}$

b) $\begin{cases} x + y + z = 0 \\ 2x + 2y + 4z = 0 \\ x + y + 3z = 0 \end{cases}$

Sistema Possível

Sistema Possível e Indeterminado

$$\begin{array}{ll} \text{ii) } x+4y=0 & \text{Sistema Possível} \\ \text{iii) } x+ty=0 & \in \text{ Indeterminado.} \end{array}$$

Sistema Possível

e Indeterminado

c) $\begin{cases} x+y+2z=0 \\ x-y-3z=0 \\ x+4y=0 \end{cases}$

	1	1	2	1	1	5 - (-4)	Sistema
$x - y - 3z = 0$	1	-1	-3	1	-1	0 = 19	Possível e
$x + 4y = 0$	1	4	0	1	4	19 ≠ 0,	Determinado

$\frac{-1-12}{-2-12}$ $\frac{-3+8}{-2+8}$

$$\textcircled{6} \quad \begin{array}{l} \text{a) } \begin{cases} 3x + my = 2 \\ x - y = 1 \end{cases} \quad \text{b) } \begin{cases} 3x + 2(m-1)y = 1 \\ mx - 4y = 0 \end{cases} \quad m^2 - m + 6 \neq 0 \\ \boxed{1 - 4 \cdot 1 \cdot 6 < 0} \quad \mathbb{R} \end{array}$$

$$c) \begin{cases} x-y=2 \\ x+my=-z \\ -x+y-z=4 \end{cases} \quad \left| \begin{array}{ccc|ccccc} 1 & -1 & 0 & | & 0 & 0 & -1 & 0 & 0 \\ 1 & m & -1 & = & 1 & m & -1 & 1 & m \\ -1 & 1 & -1 & | & -1 & 1 & -1 & -1 & 1 \end{array} \right. \quad \begin{matrix} \text{dará SPD para} \\ \text{todo } m \neq -1 \end{matrix}$$

$$d) \begin{cases} mx + y - z = 4 \\ x + my + z = 0 \\ x - y = 2 \end{cases} \quad \left| \begin{array}{ccc|cc} m & 1 & -1 & | & 1 \\ 1 & m & 1 & | & m \\ 1 & -1 & 0 & | & -1 \end{array} \right. \quad \begin{array}{l} (1+1) - (-m-m) \neq 0 \\ 2 - (-2m) \neq 0 \\ 1+m \neq 0 \end{array} \quad \begin{array}{l} \text{Local SPD para} \\ \text{toda } m \neq -1. \\ m \neq -1 \end{array}$$

7) Pega ok = +6 = x $\begin{cases} x+y=225 \\ 6x-2y=750 \end{cases}$ $\begin{array}{l} 3x-y=375 \\ x+y=225 \end{array}$ $\begin{array}{l} 150+y=225 \\ y=75 \end{array}$

Pega ruim = -2 = y $\begin{array}{l} 6x-2y=750 \\ 4x=600 \end{array}$ $x=150$

R: Ela produzir 150 peças corretamente.

8) Carro = $60/\text{km} = x$ $\begin{cases} x+y=540 \\ 0,6x+0,2y=300 \end{cases}$ $\begin{array}{l} 3x+6y=1500 \\ x+y=540 \end{array}$ $\begin{array}{l} 6x=960 \\ x=480 \\ y=60 \end{array}$

R: Takumi deve percorrer 180 km na Toyota e 60 km na scooter.

9) $x=25$ $\begin{cases} x+y+z=92 \\ 2x+y=92 \\ 2x+5y+10z=500 \end{cases}$ $\begin{array}{l} 2x+y=92 \\ 12x+5y=500 \\ 11x=552 \end{array}$ $\begin{array}{l} y=52 \\ -y=-52 \end{array}$

$y=52$ $x=z$

R: Ela precisará de 52 cédulas de cinco reais.

10) Kiba: x $\begin{cases} x+y=109 \\ x+z=142 \\ y+z=97 \end{cases}$ $\begin{array}{l} 65+y=97 \\ x-y=45 \\ x+y=109 \end{array}$ $\begin{array}{l} y=32 \\ 2x=154 \\ x=77 \end{array}$ $\begin{array}{l} 77+z=142 \\ z=65 \end{array}$

Akamaru: y

Tamaki: z

Pesos, em kg: Kiba - 76; Akamaru - 32; Tamaki - 65.