

1)

$$R) T + 80C = 39$$

$$T + 55C = 31.5$$

$$T = 39 - 80C$$

$$(39 - 80C) + 55C = 31.5$$

$$39 - 80C + 55C = 31.5$$

$$39 - 25C = 31.5$$

$$-25C = 7.5$$

$$C = 0.3 \rightarrow T = 39 - 80C \quad T = 39 - 80(0.3) \quad T = 39 - 24 \quad T = 15$$

Methode

$$\begin{array}{|c|c|c|} \hline & 1 & 80 \\ \hline & 1 & 55 \\ \hline \end{array} \quad \begin{array}{|c|c|c|} \hline & 1 & 7 \\ \hline & 1 & 34 \\ \hline \end{array} \quad \begin{array}{|c|c|c|} \hline & C & | \\ \hline & 31.5 & | \\ \hline \end{array}$$
$$A_1 = \begin{bmatrix} 1 & 80 \\ 1 & 55 \end{bmatrix} \quad A = (1 \times 55) - (1 \times 80) = 55 - 80 = -25$$
$$A_2 = \begin{bmatrix} 1 & 39 \\ 1 & 34 \end{bmatrix}$$
$$A_3 = \begin{bmatrix} 1 & 80 \\ 1 & 39 \end{bmatrix}$$

$$A_{11} = (39 \cdot 55) - (31.5 \cdot 80) = 2145 + 2520 = 375$$

$$A_{12} = (1 \cdot 31.5) - (1 \cdot 39) = 31.5 - 39 = -7.5$$

Regula de cramer

$$T = \frac{|A_1|}{|A|} = \frac{-375}{-25} = 15$$

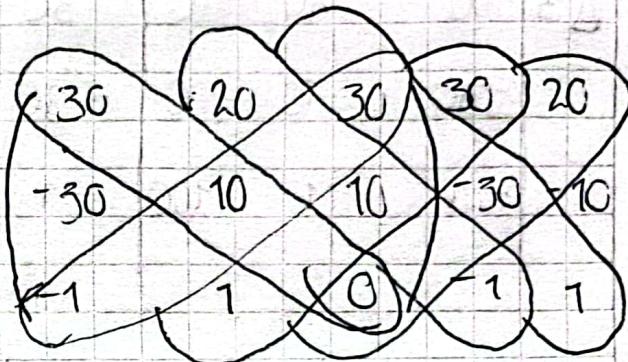
$$C = \frac{|A_2|}{|A|} = \frac{-7.5}{-25} = 0.3$$

2.

$$\cdot 30x + 20y - 30z = 0$$

$$\cdot 30x - 10y + 10z = 0$$

$$\cdot -x + y + 10z = 100$$



$$= 1(30)(10)(0) + (20)(10)(-1) + (50)(-30)(1)$$

$$= 0 \cdot (-1) \cdot (10) \cdot (30) \cdot (1) \cdot (10) \cdot (30) \cdot (0) \cdot (-30) \cdot (20)$$

$\Delta_1$	0	20	-30	0	20
	0	10	10	0	10
	100	1	0	-100	1

$$(0)(10)(10) + (20)(10)(100) + (-30)(-100)$$

$$- (100)(10)(-30) = 1(10)(0) \cdot (0) \cdot (0) \cdot (20)$$

$$20.000 + 30.000$$

$\Delta_2$	30	0	-30	30	0
	-30	0	10	-30	0
	1	100	1	-1	100

$= + (50)(0)(0) + (0)(10)(-1) +$

$(50)(-30)(-30)(-100)$

$= 0 + 0 + 90.000 - 0 - 30.000$

$= 60.000$

$$\Delta 3 \left| \begin{array}{ccc|cc} 30 & 20 & 0 & 30 & 20 \\ -30 & 10 & 0 & -30 & 10 \\ -1 & 1 & 100 & -1 & 1 \end{array} \right.$$

$$\begin{aligned}
 &= + (30)(10)(100) + (20)(0)(-1) + (0)(-30)(1) \\
 &= - (-1)(10)(0) - (1)(0)(30) - (100)(-30)(20) \\
 &= 30.000 + 0 + 0 - 0 - 0 = 60.000 \\
 &= 90.000
 \end{aligned}$$

3)

$$a n^2 + b \cdot 2^{(n-1)} = 4 \cdot 2^9 + 4 \cdot 2^{12} = 2098$$

En 10 días ~~se~~ había 2098 personas enfermas  
 y en 21 días había 6.500.000 personas enfermas.

$$6.500.000 = 4 \cdot 2^{n+1}$$

$$2^{n+1} = \frac{6.500.000}{4} - 1.625.000$$

$$(n+1) = \log \left( \frac{6.500.000}{4} \right) - \log (1.625.000) = 20,6 \quad n = 20,6$$

$$4) x^2 + 5x - 3000 = 0$$

$$x = 300$$

$$y = x + 5$$

$$\Rightarrow (x+5) = 300$$

$$x^2 + 5x - 3000 = 0$$

$$x = \frac{-5 + \sqrt{5^2 + 4(1)(-300)}}{2(1)} \rightarrow x = 5 + \sqrt{1225}$$

$$\sqrt{1225} = 35$$

$$x = -5 + \frac{\sqrt{1225}}{2}$$

$$x = \frac{-30}{2} = 15$$

$$x = \frac{-40}{2} = -20$$

$$x = -\frac{5 \pm 35}{2} \quad 15 \times 20 \times 5 = 1500$$

Largo 15cm

Ancho 20cm

$$y = x + 5 = 15 + 5 = 20$$

5) Matriz de formica

matriz vacía

$$C = \begin{bmatrix} 1000 & 500 & 300 \\ 2000 & 1000 & 600 \end{bmatrix}$$

$$y = \begin{bmatrix} 1100 & 550 & 350 \\ 2000 & 1100 & 700 \end{bmatrix}$$

$$T = C + U = \begin{bmatrix} 1000 + 1100 & 500 + 550 & 300 + 350 \\ 2000 + 2000 & 1000 + 1100 & 600 + 700 \end{bmatrix}$$

$$T = \begin{bmatrix} 2100 & 1050 & 650 \\ 4200 & 2100 & 1300 \end{bmatrix}$$

## 6. Primera tienda

Compra : ( 1000 500 300 )

Venta : ( 1100 550 350 )

## Segunda tienda

Compra : ( 2000 1000 600 )

Venta : ( 2200 1000 700 )

Compra = ( 1000 + 2200 + 550 + 1100 + 350 + 700 )

$$= ( 3300 \quad 1650 \quad 1050 ) = 60.000$$

7) Pasto (2017 y 2018)

250	300	20	15
300	200	10	10

sede Pasto

$$2017: 250 + 280 + 800 + 20 \\ + 15 = 685$$

$$2018: 300 + 200 + 10 + 10 = 520$$

Impalas (2017 2018)

150	2020	22	18
305	369	25	12

sede Impalas

$$2017: 150 + 220 + 22 + 18 \\ = 410$$

$$2018: 305 + 269 + 25 + 12 \\ = 611$$

8)

$$A = \begin{vmatrix} 100 & 96 & 50 & 119 \\ 111 & 115 & 59 & 124 \end{vmatrix}$$

$$B = \begin{vmatrix} 15 & 29 & 38 & 54 \\ 29 & 37 & 34 & 25 \end{vmatrix}$$

$$C = \begin{vmatrix} 100 & 96 & 50 & 119 \\ 111 & 115 & 59 & 124 \end{vmatrix} - \begin{vmatrix} 15 & 28 & 38 & 54 \\ 29 & 39 & 34 & 25 \end{vmatrix}$$

1º Tienda

$$100 \cdot 5 + 96 \cdot 29 + 50 \cdot 38 + 119 \cdot 59$$

$$= 1500 + 2789 + 1900 + 7021 = 12.105 \quad \text{Total tienda uno}$$

$$100 \cdot 29 + 96 \cdot 37 + 50 \cdot 34 + 119 \cdot 25$$

$$= 2900 + 3744 + 1700 + 2945 = 10.419 \quad \text{Total tienda dos}$$

2º Tienda

$$111 \cdot 29 + 115 \cdot 39 + 69 \cdot 34 + 125 \cdot 25$$

$$= 3216 + 4485 + 2006 + 3225 = 11935$$

$$C = \begin{pmatrix} 12.105 & 10419 \\ 14.855 & 11935 \end{pmatrix}$$

9)	0.05	0.06	0.07	0.09	150	220
	0.95	0.99	0.93	0.96	410	150
					125	80
					803	150

Bombillas transparentes

$$0.05 \cdot 150 + 0.06 \cdot 410 + 0.07 \cdot 25 + 0.09 \cdot 303$$

$$= 7.5 + 24.6 + 8.75 + 121.2 = 539.1 \rightarrow \text{Maíz}$$

$$0.95 \cdot 150 + 0.99 \cdot 410 + 0.93 \cdot 125 + 0.96 \cdot 303$$

$$= 142.5 + 389.4 + 116.25 + 290.88 = 433.03 \rightarrow \text{bananas}$$

Bombillas opacas

$$0.05 \cdot 220 + 0.06 \cdot 150 + 0.07 \cdot 8700 \cdot 150$$

$$= 11.9 + 56 + 6 = 316 \rightarrow \text{Maíz}$$

$$0.96 \cdot 220 + 0.99 \cdot 150 + 0.93 \cdot 80 + 0.96 \cdot 150$$

$$= 206 + 141 + 174.4 + 144 = 588.4$$

$$\begin{pmatrix} 53.97 & 31.6 \\ 903.05 & 568.4 \end{pmatrix}$$

10)

$x$  = tarifa mensual (Polares)

$y$  = costo por minuto

$$\begin{cases} x = 80 \\ x + 55y = 31.5 \end{cases}$$

$$A \cdot x = B$$

$$A = \begin{pmatrix} 1 & 80 \\ 1 & 55 \end{pmatrix} \quad x = \begin{pmatrix} x \\ y \end{pmatrix} \quad y = \begin{pmatrix} 31.5 \\ 39 \end{pmatrix}$$

$$|A| = (1)(55) - (1)(80) = 55 - 80 = -25$$

$$\text{adj}(A) = \begin{pmatrix} 55 & -80 \\ -1 & 1 \end{pmatrix}$$

$$A^{-1} = \frac{1}{\det(A)} \text{adj}(A) = \frac{1}{-25} \begin{pmatrix} 55 & -80 \\ -1 & 1 \end{pmatrix} = \begin{pmatrix} -55 & 80 \\ 25 & 25 \\ 1 & -1 \\ 25 & 25 \end{pmatrix}$$

$$A^{-1} \approx \begin{pmatrix} -2.2 & 3.2 \\ 0.04 & -0.04 \end{pmatrix}$$

$$\begin{pmatrix} x \\ y \end{pmatrix} = A^{-1} \begin{pmatrix} 31.5 \\ 39 \end{pmatrix}$$

$$x = (-2.2) \cdot 39 + (3.2) \cdot 31.5 = -85.8 + 108.8 = 15$$

$$y = (0.04) \cdot 39 + (-0.04) \cdot 31.5 = 1.56 - 1.26 = 0.30$$

La tarifa mensual es \$ 15 dólares

El costo por minuto es \$ 0.30 dólares

• videoclub

$I$  = Número de películas infantiles

$O$  = Número de películas adulto

$T$  = Número de películas terror

$$\bullet 0.60I + 0.50O = 0.80$$

$$\bullet 0.20I + 0.60O + 0.70T = 0.50$$

$$\bullet 0.10I + 0.30O + 0.80T = 10$$

$$X = \begin{pmatrix} I \\ O \\ T \end{pmatrix} \quad B = \begin{pmatrix} 0.80 \\ 0.50 \\ 10 \end{pmatrix}$$

$$A = \begin{pmatrix} 0.80 & 0.20 & -0.30 \\ -0.30 & 0.10 & 0.20 \\ 0.10 & 0.30 & 0.50 \end{pmatrix} \quad AX = B$$

$$1) 3I + 2O - 3T = 0$$

$$2) -3I + O + 2T = 0$$

$$3) I + 3O + 3T = 100$$

• suma ecuación 1 y 2 para eliminar  $I$

$$(3I - 3I) + (2O + O) + (-3I + 2T) = 0 \Rightarrow 3O - T = 0$$

$$T = 3O$$

• de la 1 ecuación sustituimos  $T$

$$(3I + 2O - 3(3O)) = 0 \Rightarrow 3I + 2O - 9O = 0 \Rightarrow 3I - 7O = 0$$

$$3I = 7O$$

$$I = \frac{7}{3}O$$

• de la 3 sustituimos  $T$  y  $I$

$$\left(\frac{7}{3}O\right) + 3O + 3(3O) = 100$$

$$\frac{7}{3}O + 3O + 9O = 100$$

$$\begin{array}{r} 70 + 90 + 270 = 7+9+27 \\ \hline 3 \qquad 3 \qquad 3 \end{array} \quad \begin{array}{r} 0 = 43 \\ \hline 3 \end{array} \quad 0 = 100$$

$$O = \frac{100 \cdot 3}{43} = \frac{300}{43} \approx 6.98$$

$$T = \frac{30}{43} = 3 \times \frac{300}{43} = \frac{900}{43} \approx 20.93$$

$$I = \frac{70}{3} = \frac{70}{3} \times \frac{300}{43} = \frac{2100}{129} = \frac{700}{43} \approx 16.28$$

$$I = 16.28 \quad O = 6.98 \quad T = 20.93$$