Costo de Materia Prima

(1) 5 c/rustico
7 c/moderno
12 c/colonial
$\Big\}$ $Q = [5 \ 7 \ 12]$

$$C = \begin{bmatrix} 1500 \\ 800 \\ 500 \\ 100 \\ 1000 \end{bmatrix}$$

$$R = \begin{bmatrix} \text{Acero} & \text{Madera} & \text{vidrio} & \text{Pintura} & \text{Mano de obra} \\ 5 & 20 & 16 & 7 & 17 \\ 7 & 18 & 12 & 9 & 21 \\ 6 & 25 & 8 & 5 & 13 \end{bmatrix}$$

a) La materia Prima necesaria para satisfacer todos los Pedidos

b) El costo de cada tipo de casa

c) El costo total de la materia Prima para todas las casas.

(a) $QR = [5 \ 7 \ 12] \begin{bmatrix} 5 & 20 & 16 & 7 & 17 \\ 7 & 18 & 12 & 9 & 21 \\ 6 & 25 & 8 & 5 & 13 \end{bmatrix} = 1 \times 3 \ \ 3 \times 5$

1×5

$QR = [q_{11} \ q_{12} \ q_{13} \ q_{14} \ q_{15}]$

$q_{11} = (5 \cdot 5) + (7 \cdot 7) + (12 \cdot 6) = \overset{25}{} \ \overset{49}{} \ \overset{72}{} = 146$

$q_{12} = (5 \cdot 20) + (7 \cdot 18) + (12 \cdot 25) = \overset{100}{} \ \overset{126}{} \ \overset{300}{} = 526$

$q_{13} = (5 \cdot 16) + (7 \cdot 12) + (12 \cdot 8) = \overset{80}{} \ \overset{84}{} \ \overset{96}{} = 260$

$q_{14} = (5 \cdot 7) + (7 \cdot 9) + (12 \cdot 5) = \overset{35}{} \ \overset{63}{} \ \overset{60}{} = 158$

$q_{15} = (5 \cdot 17) + (7 \cdot 21) + (12 \cdot 13) = \overset{85}{} \ \overset{147}{} \ \overset{156}{} = 388$

$$\boxed{QR = [146 \ \ 526 \ \ 260 \ \ 158 \ \ 388]}$$

(6) $RC = \begin{bmatrix} 5 & 20 & 16 & 7 & 17 \\ 7 & 18 & 12 & 9 & 21 \\ 6 & 25 & 8 & 5 & 13 \end{bmatrix} \begin{bmatrix} 1500 \\ 800 \\ 500 \\ 100 \\ 1000 \end{bmatrix} = 3 \times \underbrace{5 \quad 5} \times 1$

3×1

$RC = \begin{bmatrix} q_{11} \\ q_{21} \\ q_{23} \end{bmatrix}$

$q_{11} = (5 \cdot 1500) + (20 \cdot 800) + (16 \cdot 500) + (7 \cdot 100) + (17 \cdot 1000)$

$q_{21} = (7 \cdot 1500) + (18 \cdot 800) + (12 \cdot 500) + (9 \cdot 100) + (21 \cdot 1000)$

$q_{23} = (6 \cdot 1500) + (25 \cdot 800) + (8 \cdot 500) + (5 \cdot 100) + (13 \cdot 1000)$

$RC = \begin{bmatrix} 49200 \\ 52800 \\ 46500 \end{bmatrix}$

$q_{11} = 7500 + 16000 + 8000 + 700 + 17000 = 49200$

$q_{21} = 10500 + 14400 + 6000 + 900 + 21000 = 52800$

$q_{23} = 9000 + 20000 + 4000 + 500 + 13000 = 46500$

(c) $QRC = Q \cdot RC = [5 \; 7 \; 12] \begin{bmatrix} 49200 \\ 52800 \\ 46500 \end{bmatrix} = 1 \times \underbrace{3 \quad 3} \times 1$

1×1

$QRC = [\, q_{11} \,]$

$q_{11} = (5 \cdot 49200) + (7 \cdot 52800) + (12 \cdot 46500)$

$q_{11} = 246000 + 369600 + 558000 = 1,173,600$

$QRC = [1,173,600]$

(2) Concesion de $1.360,000 ÷ 100 cientificos [A - $20.000, B - $8.000, C - $10,000]

A = 5B ¿Cuantos cientificos Pertenecen a cada grupo?

Grupo = Variable

A = x

B = y

C = z

$$A + B + C = 100$$

$$20{,}000A + 8{,}000B + 10{,}000C = 1360{,}000$$

$$20{,}000A - 40000B = 0$$

Creamos la matriz =

$$A = \left(\begin{array}{ccc|c} 1 & 1 & 1 & 100 \\ 20 & 8 & 10 & 1360 \\ 20 & -40 & 0 & 0 \end{array}\right) \quad R2 \to R1(-20) + R2$$

$$\begin{array}{cccc} -20 & -20 & -20 & -2000 \\ 20 & 8 & 10 & 1360 \\ \hline NR2 = 0 & -12 & -10 & -640 \end{array}$$

$R3 \to R1(-20) + R2$

$$\begin{array}{cccc} -20 & -20 & -20 & -2000 \\ 20 & -40 & 0 & 0 \\ \hline NR3 = 0 & -60 & -20 & -2000 \end{array}$$

$$A = \left(\begin{array}{ccc|c} 1 & 1 & 1 & 100 \\ 0 & -12 & -10 & -640 \\ 0 & 40 & 0 & 0 \end{array}\right) \quad R2 \to R2(-1/12)$$

$NR2 = 0 \quad 1 \quad 5/6 \quad 160/3$

$R3 \to R2(40) + R3$

$$\begin{array}{cccc} 0 & 40 & 100/3 & 6400/3 \\ 0 & -40 & 0 & 0 \\ \hline NR3 = 0 & 0 & 100/3 & 6400/3 \end{array}$$

$$A = \left(\begin{array}{ccc|c} 1 & 1 & 1 & 100 \\ 0 & 1 & 5/6 & 160/3 \\ 0 & 0 & 100/3 & 6400/3 \end{array}\right) \quad R3 \to R3(3/100)$$

$NR3 = 00 \quad 1 \quad 64$

Matriz Final

$$A = \left(\begin{array}{ccc|c} 1 & 1 & 1 & 100 \\ 0 & 1 & 5/6 & 160/3 \\ 0 & 0 & 1 & 64 \end{array}\right)$$

$x + y + z = 100 - 40 - 20 = 40$

$x = 40$

$y = 20$

$z = 40$

(3) 150 Euros ⟶ 12 Artículos { Discos — 20 Euros; Libros — 15 Euros; carpetas — 5 Euros

X = Discos
y = Libros
z = carpetas

$$\begin{cases} x+y+z=12 \\ 20x+15y+5z=150 \\ x+z=3y \end{cases} \quad \begin{cases} x+y+z=12 \\ 4x+3y+z=30 \\ x-3y+z=0 \end{cases}$$

Creamos la matriz=

$$A=\left[\begin{array}{ccc|c} 1 & 1 & 1 & 12 \\ 4 & 3 & 1 & 30 \\ 1 & -3 & 1 & 0 \end{array}\right] \quad R_2 \to R_1(-4)+R_2$$

$$\begin{array}{cccc} -4 & -4 & -4 & -48 \\ 4 & 3 & 1 & 30 \\ \hline NR_2=0 & -1 & -3 & -18 \end{array}$$

$R_3 \to R_1(-1)+R_3$

$$\begin{array}{cccc} -1 & -1 & -1 & -12 \\ 1 & -3 & 1 & 0 \\ \hline NR_3=0 & -4 & 0 & -12 \end{array}$$

$$A=\left[\begin{array}{ccc|c} 1 & 1 & 1 & 12 \\ 0 & -1 & -3 & -18 \\ 0 & -4 & 0 & -12 \end{array}\right] \quad R_2 \to R_2(-1)$$

$NR_2 = 0\ 1\ 3\ 18$

$R_3 \to R_2(4)+R_3$

$$\begin{array}{cccc} 0 & 4 & 12 & 72 \\ 0 & -4 & 0 & -12 \\ \hline NR_3=0 & 0 & 12 & 60 \end{array}$$

$R_1 \to R_2(-1)+R_1$

$$\begin{array}{cccc} 0 & -1 & -3 & -18 \\ 1 & 1 & 1 & 12 \\ \hline NR_1=1 & 0 & -2 & -6 \end{array}$$

$$A=\left[\begin{array}{ccc|c} 1 & 0 & -2 & -6 \\ 0 & 1 & 3 & 18 \\ 0 & 0 & 12 & 60 \end{array}\right] \quad R_3 \to R_3(1/12)$$

$NR_3 = 0\ 0\ 1\ 5$

$R_1 \to R_3(2)+R_1$

$$\begin{array}{cccc} 0 & 0 & 2 & 10 \\ 1 & 0 & -2 & -6 \\ \hline NR_1=1 & 0 & 0 & 4 \end{array}$$

$R_2 \to R_3(-3)+R_2$

$$\begin{array}{cccc} 0 & 0 & -3 & -15 \\ 0 & 1 & 3 & 18 \\ \hline NR_2=0 & 1 & 0 & 3 \end{array}$$

Matriz Final=

$$A=\left[\begin{array}{ccc|c} 1 & 0 & 0 & 4 \\ 0 & 1 & 0 & 3 \\ 0 & 0 & 1 & 5 \end{array}\right]$$

$x=4$
$y=3$
$z=5$

Se an comprado
4 Discos
3 Libros
5 carpetas

(4)

$$A = \begin{bmatrix} 3 & 15 & 17 & 19 \\ 0 & 2 & 21 & 60 \\ 0 & 0 & 1 & 50 \\ 0 & 0 & 0 & -1 \end{bmatrix}$$

$$|A| = a_{11}A_{11} + \cancel{a_{21}A_{21}} + \cancel{a_{31}A_{31}} + \cancel{a_{41}A_{41}}$$

$$A_{11} = (-1)^2 |M_{11}| = (1) \begin{vmatrix} 2 & 21 & 60 \\ 0 & 1 & 50 \\ 0 & 0 & -1 \end{vmatrix} \begin{matrix} 2 & 21 \\ 0 & 1 \\ 0 & 0 \end{matrix}$$

$$(-2 + 0 + 0) - (0 + 0 + 0) = -2 = A_{11}$$

$$|A| = (3)(-2) = -6$$

$$\boxed{|A| = -6}$$