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7926

(A) QUIZ #1

(1)

Solution : 1:2:1 2:1:1, 2:0:2

$$\begin{array}{|c|c|} \hline 40 & \\ \hline P & E \\ \hline A & E \\ \hline \end{array}$$

B₁

$$\begin{array}{|c|c|} \hline 50 & \\ \hline P & P \\ \hline A & E \\ \hline \end{array}$$

B₂

$$\begin{array}{|c|c|} \hline P & P \\ \hline A & A \\ \hline \end{array}$$

B₃

Let x, y and z be the cost / kg pak, Egyptian American cotton respectively the according to the given conditions:

$$\frac{1}{4}x + \frac{2}{4}y + \frac{1}{4}z = 40$$

$$\frac{2}{4}x + \frac{1}{4}y + \frac{1}{4}z = 50$$

$$\frac{2}{4}x + \frac{2}{4}z = 60$$

⇒ A

$$1x + 2y + 1z = 160$$

$$2x + 1y + 1z = 200$$

$$1x + 1z = 120$$

→ (B)

In matrix form we can write on

$$\begin{bmatrix} 1 & 2 & 1 \\ 2 & 1 & 1 \\ 1 & 0 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 160 \\ 200 \\ 120 \end{bmatrix}$$

②

Let $A = \begin{bmatrix} 1 & 2 & 1 \\ 2 & 1 & 1 \\ 1 & 0 & 1 \end{bmatrix}$, $x = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$, $B = \begin{bmatrix} 160 \\ 200 \\ 120 \end{bmatrix}$

$$Ax = B$$

$$\Rightarrow A \begin{bmatrix} 160 & 2 & 1 \\ 200 & 1 & 1 \\ 120 & 0 & 1 \end{bmatrix} \quad A_2 = \begin{bmatrix} 1 & 160 & 1 \\ 2 & 200 & 1 \\ 1 & 120 & 1 \end{bmatrix}$$

$$A_3 = \begin{bmatrix} 1 & 2 & 160 \\ 2 & 1 & 200 \\ 1 & 0 & 120 \end{bmatrix}$$

First $|A| = \begin{vmatrix} 1 & 2 & 1 \\ 2 & 1 & 1 \\ 1 & 0 & 1 \end{vmatrix}$ Expand by R_1

$$= 1 \begin{vmatrix} 1 & 1 & -2 \\ 0 & 1 & 1 \\ 1 & 1 & 1 \end{vmatrix} + 2 \begin{vmatrix} 2 & 1 \\ 1 & 0 \end{vmatrix} + 1 \begin{vmatrix} 2 & 1 \\ 1 & 0 \end{vmatrix}$$

$$= 1(1 \times 1 - 1 \times 0) - 2(2 \times 1 - 1 \times 1) + (2 \times 0 - 1 \times 1)$$

$$= -2$$

Now

$$|A_1| = \begin{vmatrix} 160 & 2 & 1 \\ 200 & 1 & 1 \\ 120 & 0 & 1 \end{vmatrix} \quad \text{Expand by } R_1$$

(3)

= 160

1	1	-2	200	1	+1
0	1		120	1	
			200	1	
			120	0	

$|A_1| = -120$

Similarly

$|A_2| =$

1	100	1		
2	200	1	Expand by R_1	
1	120	1		

= 1	200	1	-160	2	1	+1	2	200
	120	1		1	1		1	120

$|A_2| = -40$

$|A_3| =$

1	2	160		
2	1	200	Expand by R_1	
1	0	120		

= 1	1	200	-2	2	200	+160	2	1
	0	120		1	120		1	10

(4)

$$= 1(120-0) - 2(240-200) + 160(0-1)$$

$$|A_3| = -120$$

Now according to Cramer's rule

$$x = \frac{|A_1|}{|A|} = \frac{-120}{-2} = 60$$

$$y = \frac{|A_2|}{|A|} = \frac{-40}{-2} = 20$$

$$z = \frac{|A_3|}{|A|} = \frac{-120}{-2} = 60$$

$$(x, y, z) = (60, 20, 60)$$

Pakistan = 60

Egyptian = 20

American = 60

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