

Answer on Question #56224 – Math – Other

(b) Determine the optimal solution to the transportation problem given below using least cost method(10 marks)

	V	W	X	Y	Z	SUPPLY
A	1	9	13	36	51	50
B	24	12	16	20	1	100
C	14	33	1	23	26	150
DEMAND	100	70	50	40	40	

Solution

	V	W	X	Y	Z	SUPPLY
A	1	9	13	36	51	50
B	24	12	16	20	1	100
C	14	33	1	23	26	150
DEMAND	100	70	50	40	40	

Cells (A,V) and (C,X) and (B,Z) both have 1 cost so we arbitrarily choose the second and assign

$x_{33} = 50$. Cross out column 3. The amount left in row 3 is $150 - 50 = 100$.

$x_{25} = 40$. Cross out column 5. The amount left in row 2 is $100 - 40 = 60$.

$x_{11} = 50$. Cross out row 1. The amount left in column 1 $100 - 50 = 50$.

$x_{22} = 60$. Cross out row 2. The amount left in column 2 $70 - 60 = 10$.

Therefore,

$$x_{32} = 10; x_{31} = 50; x_{34} = 100 - (50 + 10) = 40.$$

Number of basic variables is $3 + 5 - 1 = 7$.

The final table:

	V	W	X	Y	Z	SUPPLY
A	1(50)	9	13	36	51	50
B	24	12(60)	16	20	1(40)	100
C	14(50)	33(10)	1(50)	23(40)	26	150
DEMAND	100	70	50	40	40	

The total transportation cost associated with this solution is

$$50 \cdot 1 + 60 \cdot 12 + 40 \cdot 1 + 50 \cdot 14 + 10 \cdot 33 + 50 \cdot 1 + 40 \cdot 23 = 2810.$$