Solve Problem by Simplex Method.

Max. $Z = 120x + 100y$.

Subj. to
$$2x + 2.5y \leq 1000$$
$$3x + 1.5y \leq 1200$$
$$1.5x + 4y \leq 1200$$
$$x, y \geq 0.$$

Sol^n:

Converting Cannonical form to standard form.

Max. $Z = 120x + 100y + 0.S_1 + 0.S_2 + 0.S_3$.

Subj to
$$2x + 2.5y + S_1 = 1000$$
$$3x + 1.5y + S_2 = 1200$$
$$1.5x + 4y + S_3 = 1200$$

$$x, y, S_1, S_2, S_3 \geq 0$$

Ist sterelation

e_i	C_j CVS	120 x	100 y	0 S_1	0 S_2	0 S_3	b	$\theta = b_i/a_{ik}$
0	S_1	2	2.5	1	0	0	1000	1000/2 = 500
0	S_2	③ key elem	1.5	0	1	0	1200	1200/3 = 400 ← K.R outgoing
0	S_3	1.5	4	0	0	1	1200	1200/1.5 = 800
	$E_j = \Sigma e_i a_{ij}$	0	0	0	0	0		
	$C_j - E_j$	120	100	0	0	0		

↑ Kc
(incoming variable)

e_i	C_j CVS	120 x	100 y	0 S_1	0 S_2	0 S_3	b	$\theta_i = b_i/a_{ik}$
0	S_1	0	①.5	1	−0.66	0	200	$\frac{200}{1.5} = 133.33$ ← K.R outgoing var
120	x	1	0.5 ×	0	0.33	0	400	$\frac{400}{0.5} = 800$
0	S_3	0	3.25 ×	0	−0.495	1	600	$\frac{600}{3.25} = 184.6$
	$E_j = \Sigma e_i a_{ij}$	120	60	0	39.6	0		
	$C_j - E_j$	0	40	0	−39.6	0		

New Pivot element 120

↑ Kc
In coming variable.

New Row Element = Element of the Row to be replaced − [(Intersection of old row & Key Colum) × (Corresponding elements in new pivot row)]

e_j		120	100	0	0	0		
e_i	cvs	x	y	S_1	S_2	S_3	b	Q
100	y	0	1	0.66	−0.44	0	133.33	
120	x	1	0.	−0.33	0.55	0	333.335	
0	S_3	0	0	−2.145	0.935	1	166.67	
$E_j = \Sigma e_i a_{ij}$		120	100	26.4	22	0		
$C_j - E_j$		0	0	−26.4	−22	0		

As $C_j - E_j$ row contains 0 and −ve valve
solution is the optimal solution

$$y = 133.33 \text{ UMTS}$$
$$x = 333.33 \text{ UMTS}$$

$$\therefore Z = 120x + 100y$$
$$= 120 \times 333.33 + 100 \times 133.33$$

$$Z = 53,332.6$$

$1 - 1.5 \times 0 = 1$

$6.5 - 1.5 \times 1$
$6.5 - 1.5$
$= 1$