Max
$$z = -X1 + 2X2$$

 $3X1 + 4X2 = 12$
 $2X1 - X2 \le 12$
and $X1,X2 \ge 0$;

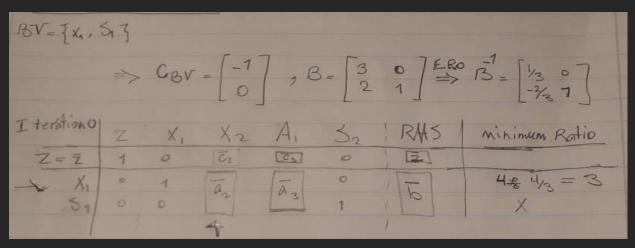
-->Part-1<--

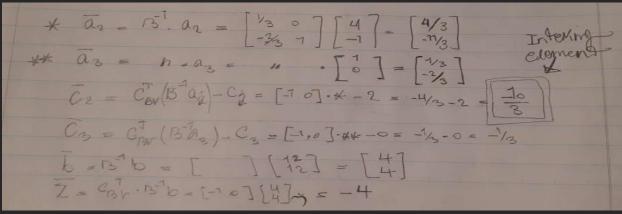
The problem is converted to canonical form by adding slack, surplus and artificial variables as appropriate

- 1. As the constraint-1 is of type '=' we should add artificial variable A1
- 2. As the constraint-2 is of type '\(\leq\'\) we should add slack variable S1

After introducing slack, artificial variables

Max z = -X1 + 2X2 + 0A1 + 0S1 subject to 3X1+4X2+A1+0S1=122X1-X2+0A1+S1=12and X1,X2,S1,A1 \geq 0





-->Part-2<--

Iteration-1		Cj	-1	2	0	
В	СВ	XB	X1	X2	S1	MinRatio
X2	2	3	3/4	1	0	
S1	0	1/5	11/4	0	1	
z=6		Zj	3/2	2	0	
		Zj-Cj	5/2	0	0	

Since all Zj-Cj≥0

Hence, optimal solution is arrived with value of variables as:

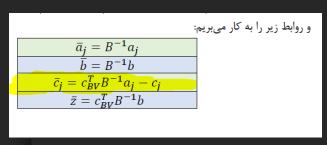
$$X1*=0$$
, $X2*=3$, $z*=6$

Q2) objective function for first phase is in this form:

Min W = A1 + ... + An

such that Ai is an artificial variable.

If we satisfied The optimal condition in last iteration of the first phase, It means z row has not any positive number. And the reduce cost coefficient of all artificial variables must be non_positive. But for stronger result we can use "Simplex algebraic formula" and show Ai = -1, Ai = -1,



Q3)

part A)

- b>=0
- c<=0
- a1 element of R
- a2 element 0f R

Part B)

- b>=0
- c <0
- a1 element of R
- a2 element of R

or

- b=0
- c =0
- a1 element of R
- a2 > 0

Part C)

- b >= 0
- c > 0
- a1 <=0
- a2 <=0

Thank You.

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