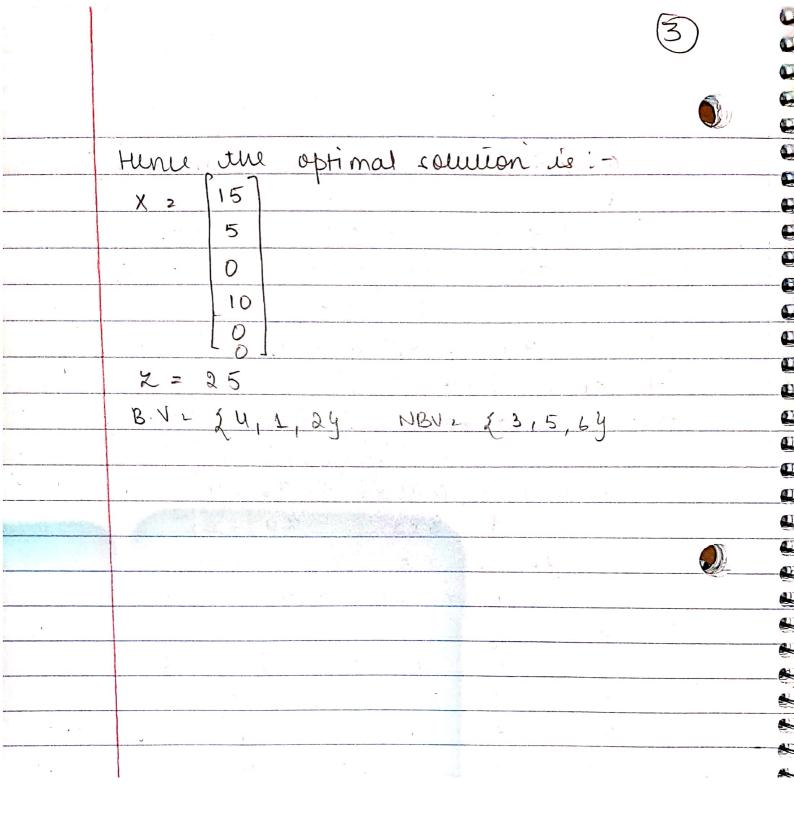


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```
gurobi> m.addConstr(3*x1+x2+x3+x4,GRB.EQUAL,60,"c0")
<gurobi.Constr *Awaiting Model Update*>
gurobi> m.addConstr(x1-x2+2*x3+x5,GRB.EQUAL,10,"c1")
<gurobi.Constr *Awaiting Model Update*>
gurobi> m.addConstr(x1+x2-x3+x6,GRB.EQUAL,20,"c2")
<gurobi.Constr *Awaiting Model Update*>
gurobi> m.optimize()
Optimize a model with 4 rows, 7 columns and 16 nonzeros
Coefficient statistics:
 Matrix range [1e+00, 3e+00]
 Objective range [1e+00, 2e+00]
 Bounds range [0e+00, 0e+00]
 RHS range [1e+01, 6e+01]
Presolve removed 1 rows and 4 columns
Presolve time: 0.01s
Presolved: 3 rows, 3 columns, 9 nonzeros
Iteration Objective Primal Inf. Dual Inf.
                                                         Time
      0 6.0000000e+01 1.999100e+01 0.000000e+00
                                                           0s
      4 2.5000000e+01 0.000000e+00 0.000000e+00
                                                           0s
Solved in 4 iterations and 0.03 seconds
Optimal objective 2.500000000e+01
gurobi> for v in m.getVars():
...... print(v.varName + ' = ' + str(v.x))
File "<stdin>", line 2
   print(v.varName + ' = ' + str(v.x))
IndentationError: expected an indented block
gurobi> for v in m.getVars():
         print(v.varName + ' = ' + str(v.x))
x1 = 0.0
x1 = 15.0
x2 = 5.0
x3 = 0.0
x4 = 10.0
x5 = 0.0
x6 = 0.0
gurobi> print(m.objVal)
25.0
```

2. Max 2x1 + 3x2 s.t 5 X1 + , 25 x2 < 4 $\chi_1 + 3\chi_2 > 20$ 21 + 22 21, X2, X3, X4 7, O. Standard from. max 2x1 + 2x2 5.6 0.5x1 + 0.25x2 + x3 2U 21 + 3x2 - 24 220 71 + x2 2, 122 x2 x4 2, 0. tablell, RHG B.V RT Z X1 X2 X3 Vu -2 -3 0 0 0 0.5 0.25 0 9 27 -1 D 20 4 B.V 2 1 3, 44 Z XI X2 X3 XU RHS B.V. RT -1 0 0 8 0 0 -0.25 1 0 2 ×3 220 -16 1 -2 0 D Xuz-4 0 0 4 13, uy is not feasible As xy cannot be regative

(a)

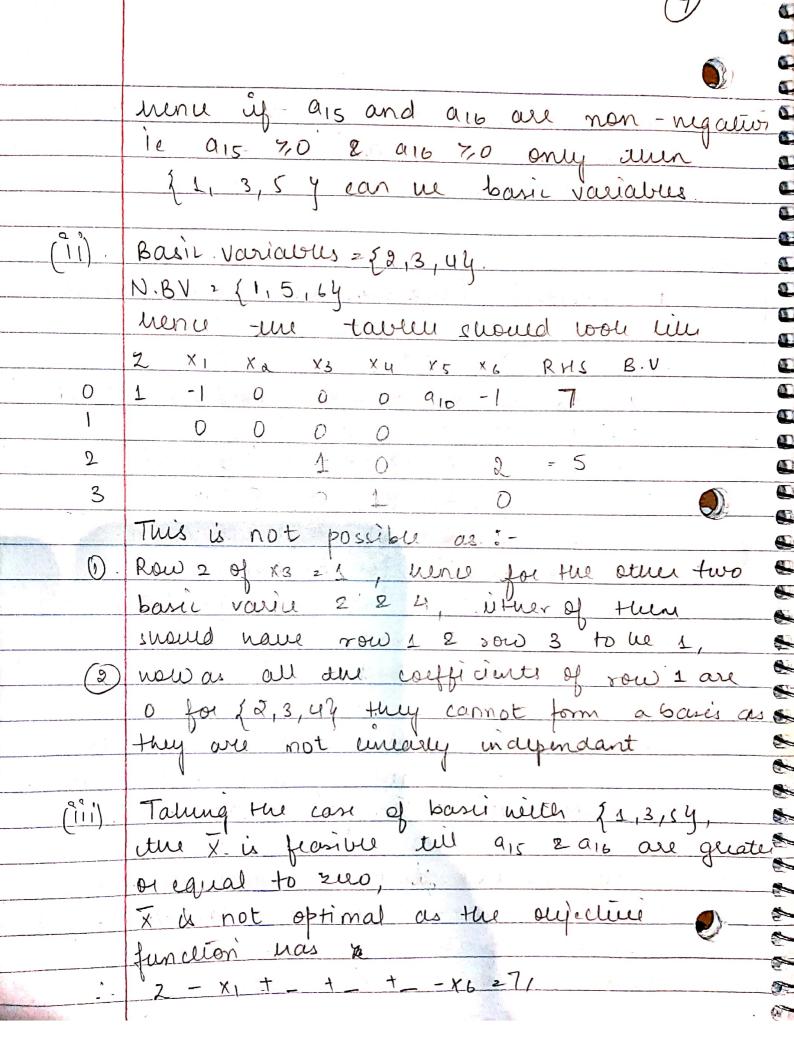
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```
gurobi> m1.addConstr(0.5*x11+0.25*x21<=4,"c0")
<gurobi.Constr *Awaiting Model Update*>
gurobi> m1.addConstr(x11+3*x21>=20,"c1"),
(<gurobi.Constr *Awaiting Model Update*>,)
gurobi> m1.addConstr(x11+x21,GRB.EQUAL,4,"c2")
<gurobi.Constr *Awaiting Model Update*>
gurobi> m1.optimize()
Optimize a model with 3 rows, 4 columns and 6 nonzeros
Coefficient statistics:
 Matrix range [3e-01, 3e+00]
 Objective range [2e+00, 3e+00]
 Bounds range [0e+00, 0e+00]
RHS range [4e+00, 2e+01]
Presolve removed 0 rows and 2 columns
Presolve time: 0.01s
Solved in 0 iterations and 0.01 seconds
Infeasible or unbounded model
```

gurobi> m1.setObjective(2*x11+3*x21,GRB.MAXIMIZE)

3.	$2 - \chi_1 = -\chi_2 = -\chi_3 = -\chi_4$
	0. 0 0 0 = = = = = = = = = = = = = = = =
	$\chi_3 = +2\chi_6 = 5$
	21
(a).	if 21,3,54 are basic variables,
	2 = * 22 + * 23 + * 24.
	if the basic variables are 1,3,5 then,
	Tableau
	Z XI X2 X3 X4 X5 X6 RHS B.V.
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	0 0 0 0 an an an
3	1 as ag ag ag 0 a ₁₆
M0000011012	
3 4	J B.V. 31,3,54, NBVL 22,4,64
	for 1 to me basic, A: = 0 for i + B: turne maning Row 0 of x1 = 0 Row 0 + Rows
3	3
<u> </u>	7 X1 X2 X3 X4 X5 X6 RMS
3 9 9 3	2 1 7+91
3	0 0 0 0 0
	1 00 00 0 0 - 5
	1 ay 0620- ag a15-0 0 = 016
	nenu x3 25 2 x 2 2 16.
-3	X5 , Q15



hence ner can optimise du solution Cassuming maximization) tell all the elements row o are positive. is optimal starting with {1,3,54 + B.V {2,4,63+NBV. with conclute values Fabllul X6 RHS B.V R.T. X3 XU 10 5 2 2 0 15 2 for morning 1 B.V. RDW3 RMS B-V xu x3 22 - 1. 0 T 10 x2=10 2 2 0 0 uenu in this tableau neith these values the souther is optimal with zzaz. In the tableau designed above, we only 5, one unique optimal solution, as the coefficients of all NBV £2,4,64 are non-200 in the styletter function.

