Determine the constraint inequalities and objective function for Exercise 9(a)

Let x be # of units of Policy A.

" y " " B.

$10{,}000x + 15{,}000y \geq 300{,}000$

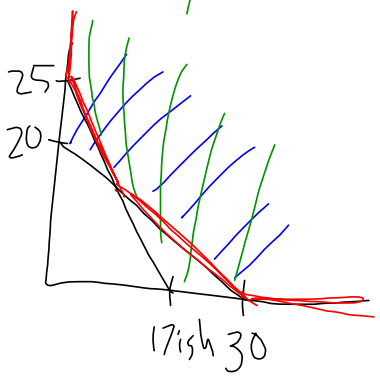
$180{,}000x + 120{,}000y \geq 3{,}000{,}000$

~~$10x + 15y \geq 300$~~

$2x + 3y \geq 60$

$3x + 2y \geq 50$

$C = 50x + 40y$



Constraints

$2x+3y \geq 60$

$3x+2y \geq 50$

Objective function

$z = 50x+40y$

$$A = \begin{bmatrix} 2 & 3 & 60 \\ 3 & 2 & 50 \\ 50 & 40 & 0 \end{bmatrix}$$

#1 from instructions

$$A^T = \begin{bmatrix} 2 & 3 & 50 \\ 3 & 2 & 40 \\ 60 & 50 & 0 \end{bmatrix}$$

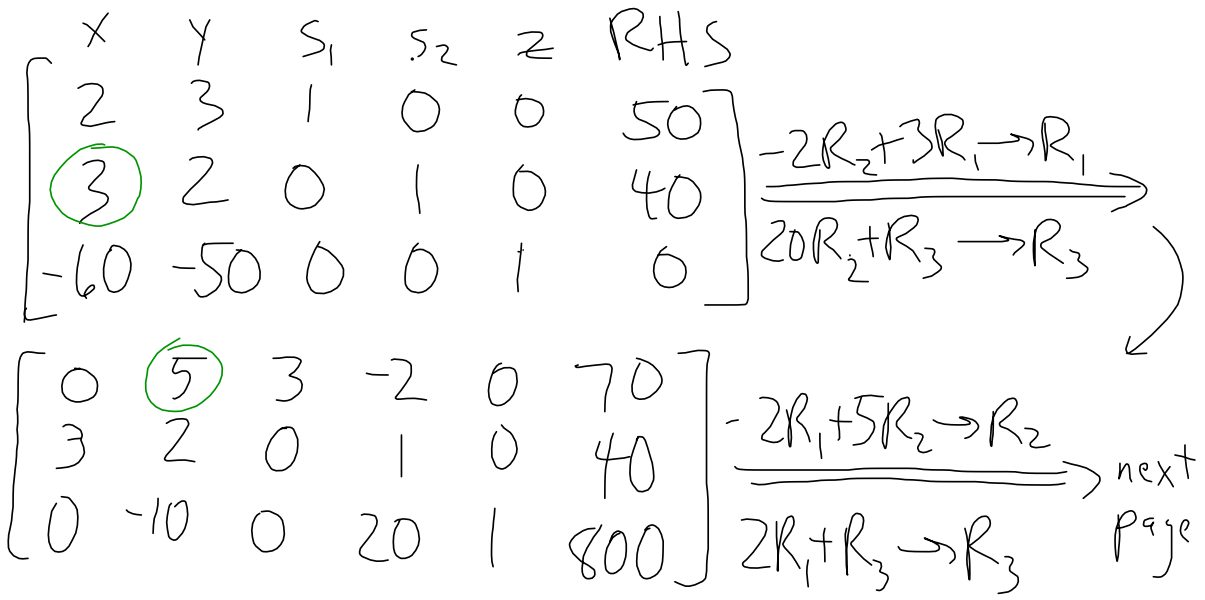
Dual problem: #2 from instructions

$2x + 3y \leq 50$

$3x + 2y \leq 40$

$z = 60x + 50y$

Solve this by the simplex method.


x y S_1 S_2 z RHS
2 3 1 0 0 50
3 2 0 1 0 40
-60 -50 0 0 1 0
$-2R_2+3R_1 \to R_1$
$20R_2+R_3 \to R_3$
0 5 3 -2 0 70
3 2 0 1 0 40
0 -10 0 20 1 800
$-2R_1+5R_2 \to R_2$
$2R_1+R_3 \to R_3$
next page

$$\begin{array}{cccccc} x & y & s_1 & s_2 & z & \\ \left[\begin{array}{cccccc} 0 & 5 & 3 & -2 & 0 & 70 \\ 15 & 0 & -6 & 9 & 0 & 60 \\ 0 & 0 & 6 & 16 & 1 & 940 \end{array}\right] \end{array}$$

Once this is 1, these are the values of the variables that minimize, this is the minimum

Solution
$x = 6$, $y = 16$
gives $z = 940$

$$\begin{bmatrix} x & y & s_1 & s_2 & s_3 & z & RHS \\ 0 & 3 & 7 & -3 & * & * & * \\ 15 & -5 & 1 & 0 & * & * & * \\ 0 & 10 & 15 & 0 & 25 & 5 & 80 \\ 0 & 2 & 3 & 0 & 5 & 1 & 16 \end{bmatrix}$$

What would values of varibles and minimum be? $x_1 = 3, x_2 = 0, x_3 = 5$

Minimum is $z = 16$

$6x+5y \geq 25$
$2x+6y \geq 15$

$z = 3x+2y$

Minimize z

Due Fri. 2/5 start of class.

$3x+5y \leq 12 \longrightarrow 3x+5y+1s_1^{+0s_2} = 12$

$2x+y \leq 15 \longrightarrow 2x+1y^{+0s_1}+1s_2 = 15$

$z = 20x+50y$

Not part of lecture.

x	y	s_1	s_2	z	RHS
3	5	1	0	0	12
2	1	0	1	0	15
-20	-50	0	0	1	0