

Math 336
 Spring 2024
 Dr. Lily Yen

Quiz 4

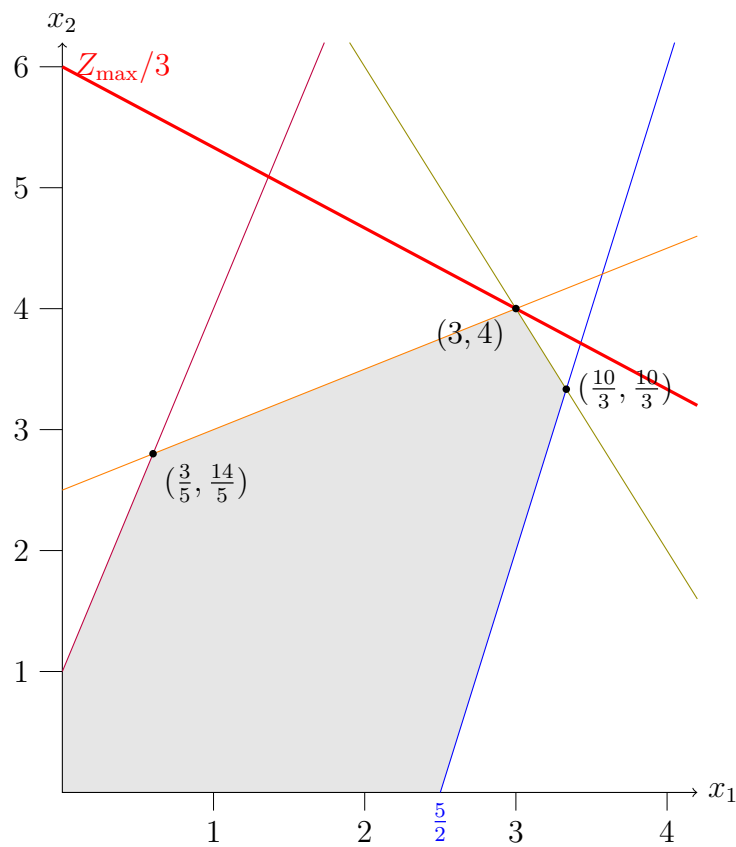
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Problem 1: Use the Simplex Method in tabular form to begin solving the following.

$$\begin{aligned}
 &\text{Maximize} && Z = 2x_1 + 3x_2 && x_2 = -\frac{2}{3}x_1 + \frac{1}{3}Z \\
 &\text{subject to} && -3x_1 + x_2 \leq 1, && x_2 \leq 3x_1 + 1 \\
 &&& 4x_1 + 2x_2 \leq 20, && x_2 \leq -2x_1 + 10 \\
 &&& 4x_1 - x_2 \leq 10, && x_2 \geq 4x_1 - 10 \\
 &&& -x_1 + 2x_2 \leq 5, && x_2 \leq \frac{1}{2}x_1 + \frac{5}{2} \\
 &\text{and} && x_1, x_2 \geq 0.
 \end{aligned}$$

Five points for a correct drawing of the feasible region with all corner-point feasible solutions found and labelled.



On the tableaux below, carry out the simplex method for Iterations 0 and 1 and indicate the pivot in Iteration 1 for Iteration 2. You DON'T have to carry out Iteration 2 and beyond.

It.	B.V.	Eq	Z	x_1	x_2	x_3	x_4	x_5	x_6	RHS	Ratio
0	Z	(0)	1	-2	-3	0	0	0	0	0	
	x_3	I	0	-3	1	1	0	0	0	1	$\frac{1}{1} = 1$
	x_4	II	0	4	2	0	1	0	0	20	$\frac{20}{2} = 10$
	x_5	III	0	4	-1	0	0	1	0	10	$\frac{10}{-1} = -10$
	x_6	IV	0	-1	2	0	0	0	1	5	$\frac{5}{2}$
1	Z	(0)	1	-11	0	3	0	0	0	3	
	x_2	I	0	-3	1	1	0	0	0	1	$-\frac{1}{3}$
	x_4	II	0	10	0	-2	1	0	0	18	$\frac{18}{10} = 1.8$
	x_5	III	0	1	0	1	0	1	0	11	$\frac{3}{5}$
	x_6	IV	0	-1	2	0	0	0	1	5	$\frac{5}{2}$
2	Z	(0)	1	0	0	$-\frac{7}{5}$	0	0	$\frac{11}{5}$	3	
	x_2	I	0	0	1	$-\frac{1}{5}$	0	0	$\frac{3}{5}$	$\frac{14}{5}$	-14
	x_4	II	0	0	0	2	1	0	-2	12	6
	x_5	III	0	0	0	$\frac{7}{5}$	0	1	$-\frac{1}{5}$	$10\frac{2}{5}$	$\frac{52}{7}$
	x_1	IV	0	1	0	$-\frac{2}{5}$	0	0	$\frac{1}{5}$	$\frac{3}{5}$	$\frac{3}{2}$
3	Z	(0)	1	0	0	0	$\frac{7}{10}$	0	$\frac{4}{5}$	18	
	x_2	I	0	0	1	0	$\frac{1}{10}$	0	$\frac{2}{5}$	4	
	x_3	II	0	0	0	1	$\frac{1}{2}$	0	-1	6	
	x_5	III	0	0	0	0	$-\frac{7}{10}$	1	$\frac{13}{5}$	2	
	x_1	IV	0	1	0	0	$\frac{1}{5}$	0	$-\frac{1}{5}$	3	
4											

Score: /10