$$\begin{cases} 6x_1 + 16x_2 + x_3 = 48000 \\ 12x_1 + 6x_2 + x_4 = 42000 \\ 9x_1 + 9x_2 + x_5 = 36000 \end{cases}$$

$$Z = 4x_1 + 3x_2 + 0x_3 + 0x_4 + 0x_5$$

		c_j						
c_k	x_k	B	A_1	A_2	A_3	A_4	A_5	b_i/a_{ij}
Z								

$$\begin{cases} 6x_1 + 16x_2 + x_3 = 48000 \\ 12x_1 + 6x_2 + x_4 = 42000 \\ 9x_1 + 9x_2 + x_5 = 36000 \end{cases}$$

$$Z = 4x_1 + 3x_2 + 0x_3 + 0x_4 + 0x_5$$

		c_j	4	3	0	0	0	
c_k	x_k	B	A_1	A_2	A_3	A_4	A_5	b_i/a_{ij}
Z								

$$\begin{cases} 6x_1 + 16x_2 + x_3 = 48000 \\ 12x_1 + 6x_2 + x_4 = 42000 \\ 9x_1 + 9x_2 + x_5 = 36000 \end{cases}$$

$$Z = 4x_1 + 3x_2 + 0x_3 + 0x_4 + 0x_5$$

		c_j	4	3	0	0	0	
c_k	x_k	B	A_1	A_2	A_3	A_4	A_5	b_i/a_{ij}
	x_3 x_4 x_5							
Z								

$$\begin{cases} 6x_1 + 16x_2 + x_3 = 48000 \\ 12x_1 + 6x_2 + x_4 = 42000 \\ 9x_1 + 9x_2 + x_5 = 36000 \end{cases}$$

$$Z = 4x_1 + 3x_2 + 0x_3 + 0x_4 + 0x_5$$

		c_j	4	3	0	0	0	
c_k	x_k	B	A_1	A_2	A_3	A_4	A_5	b_i/a_{ij}
0	x_3	48.000						
0	x_4	42.000						
0	x_5	36.000						
Z								

$$\begin{cases} 6x_1 + 16x_2 + x_3 = 48000 \\ 12x_1 + 6x_2 + x_4 = 42000 \\ 9x_1 + 9x_2 + x_5 = 36000 \end{cases}$$

$$Z = 4x_1 + 3x_2 + 0x_3 + 0x_4 + 0x_5$$

		c_j	4	3	0	0	0	
c_k	x_k	B	A_1	A_2	A_3	A_4	A_5	b_i/a_{ij}
0	x_3	48.000	6	16	1			
0	x_4	42.000	12	6		1		
0	x_5	36.000	9	9			1	
Z								

$$\begin{cases} 6x_1 + 16x_2 + x_3 = 48000 \\ 12x_1 + 6x_2 + x_4 = 42000 \\ 9x_1 + 9x_2 + x_5 = 36000 \end{cases}$$

$$Z = 4x_1 + 3x_2 + 0x_3 + 0x_4 + 0x_5$$

		c_j	4	3	0	0	0	
c_k	x_k	B	A_1	A_2	A_3	A_4	A_5	b_i/a_{ij}
0	x_3	48.000	6	16	1			
0	x_4	42.000	12	6		1		
0	x_5	36.000	9	9			1	
Z = 0								

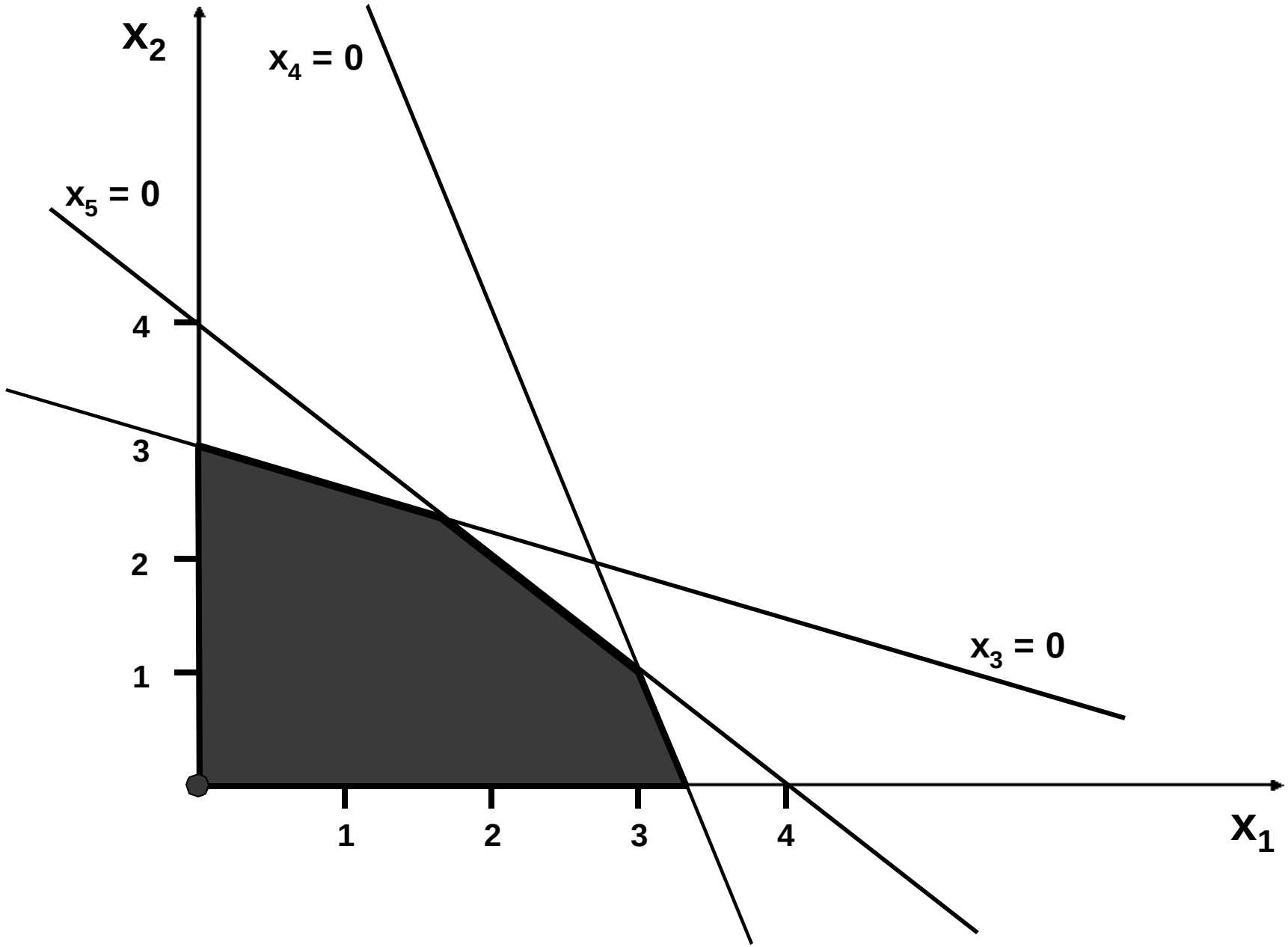
$$Z = \sum c_k \cdot x_k$$

$$\begin{cases} 6x_1 + 16x_2 + x_3 = 48000 \\ 12x_1 + 6x_2 + x_4 = 42000 \\ 9x_1 + 9x_2 + x_5 = 36000 \end{cases}$$

$$Z = 4x_1 + 3x_2 + 0x_3 + 0x_4 + 0x_5$$

		c_j	4	3	0	0	0	
c_k	x_k	B	A_1	A_2	A_3	A_4	A_5	b_i/a_{ij}
0	x_3	48.000	6	16	1			
0	x_4	42.000	12	6		1		
0	x_5	36.000	9	9			1	
Z = 0			- 4	- 3	0	0	0	

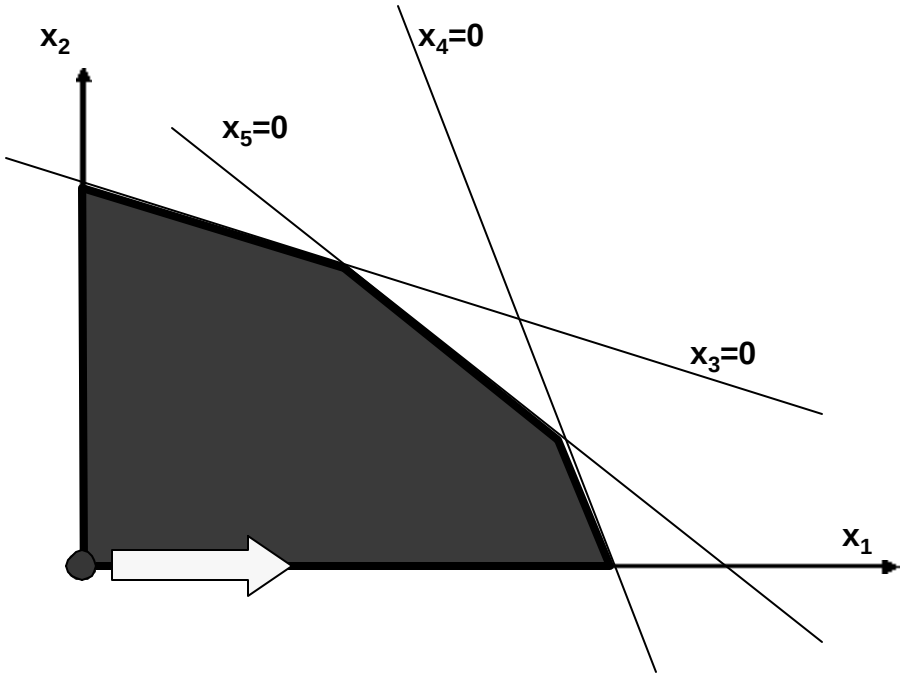
$$z_j - c_j = \sum c_k a_{ij} - c_j$$


x2
x4 = 0
x5 = 0
4
3
2
1
x3 = 0
1
2
3
4
x1

		c_j	4	3	0	0	0	
$\mathbf{c_k}$	$\mathbf{x_k}$	**B**	$\mathbf{A_1}$	$\mathbf{A_2}$	$\mathbf{A_3}$	$\mathbf{A_4}$	$\mathbf{A_5}$	b_i/a_{ij}
0	$\mathbf{x_3}$	48.000	6	16	1			
0	$\mathbf{x_4}$	42.000	12	6		1		
0	$\mathbf{x_5}$	36.000	9	9			1	
Z = 0			- 4	- 3	0	0	0	

		c_j	4	3	0	0	0	
$\mathbf{c_k}$	$\mathbf{x_k}$	**B**	$\mathbf{A_1}$	$\mathbf{A_2}$	$\mathbf{A_3}$	$\mathbf{A_4}$	$\mathbf{A_5}$	b_i/a_{ij}
0	$\mathbf{x_3}$	48.000	6	16	1			
0	$\mathbf{x_4}$	42.000	12	6		1		
0	$\mathbf{x_5}$	36.000	9	9			1	
Z = 0			- 4	- 3	0	0	0	

		c_j	4	3	0	0	0	
c_k	x_k	B	A_1	A_2	A_3	A_4	A_5	b_i/a_{ij}
0	x_3	48.000	6	16	1			
0	x_4	42.000	12	6		1		
0	x_5	36.000	9	9			1	
Z = 0			- 4	- 3	0	0	0	



		c_j	4	3	0	0	0	
$\mathbf{c_k}$	$\mathbf{x_k}$	**B**	$\mathbf{A_1}$	$\mathbf{A_2}$	$\mathbf{A_3}$	$\mathbf{A_4}$	$\mathbf{A_5}$	b_i/a_{ij}
0	$\mathbf{x_3}$	48.000	6	16	1			8.000
0	$\mathbf{x_4}$	42.000	12	6		1		3.500
0	$\mathbf{x_5}$	36.000	9	9			1	4.000
Z = 0			- 4	- 3	0	0	0	

		c_j	4	3	0	0	0	
c_k	x_k	B	A_1	A_2	A_3	A_4	A_5	b_i/a_{ij}
0	x_3	48.000	6	16	1			8.000
0	x_4	42.000	12	6		1		3.500
0	x_5	36.000	9	9			1	4.000
Z = 0			- 4	- 3	0	0	0	

$$\theta = \min \frac{b_i}{a_{ij}}$$

		c_j	4	3	0	0	0	
c_k	x_k	**B**	A_1	A_2	A_3	A_4	A_5	b_i/a_{ij}
0	x_3	48.000	6	16	1			8.000
0	x_4	42.000	(12)	6		1		3.500
0	x_5	36.000	9	9			1	4.000
Z = 0			- 4	- 3	0	0	0	

		c_j	4	3	0	0	0	
c_k	x_k	**B**	A_1	A_2	A_3	A_4	A_5	b_i/a_{ij}
0	x_3	48.000	6	16	1			8.000
0	x_4	42.000	(12)	6		1		3.500
0	x_5	36.000	9	9			1	4.000
Z = 0			- 4	- 3	0	0	0	

	x_3							
	x_1							
	x_5							

		c_j	4	3	0	0	0	
c_k	x_k	B	A_1	A_2	A_3	A_4	A_5	b_i/a_{ij}
0	x_3	48.000	6	16	1			8.000
0	x_4	42.000	(12)	6		1		3.500
0	x_5	36.000	9	9			1	4.000
Z = 0			- 4	- 3	0	0	0	

0	x_3							
4	x_1							
0	x_5							

		c_j	4	3	0	0	0	
c_k	x_k	B	A_1	A_2	A_3	A_4	A_5	b_i/a_{ij}
0	x_3	48.000	6	16	1			8.000
0	x_4	42.000	(12)	6		1		3.500
0	x_5	36.000	9	9			1	4.000
Z = 0			- 4	- 3	0	0	0	

0	x_3				1			
4	x_1		1					
0	x_5						1	
			0		0		0	

		c_j	4	3	0	0	0	
$\mathbf{c_k}$	$\mathbf{x_k}$	**B**	$\mathbf{A_1}$	$\mathbf{A_2}$	$\mathbf{A_3}$	$\mathbf{A_4}$	$\mathbf{A_5}$	b_i/a_{ij}
0	$\mathbf{x_3}$	48.000	6	16	1			8.000
0	$\mathbf{x_4}$	42.000	(12)	6		1		3.500
0	$\mathbf{x_5}$	36.000	9	9			1	4.000
Z = 0			- 4	- 3	0	0	0	

0	$\mathbf{x_3}$				1			
4	$\mathbf{x_1}$	3.500	1	1/2		1/12		
0	$\mathbf{x_5}$						1	
			0		0		0	

		c_j	4	3	0	0	0	
c_k	x_k	**B**	A_1	A_2	A_3	A_4	A_5	b_i/a_{ij}
0	x_3	48.000	6	16	1			8.000
0	x_4	42.000	(12)	6		1		3.500
0	x_5	36.000	9	9			1	4.000
Z = 0			- 4	- 3	0	0	0	

0	x_3	27.000			1			
4	x_1	3.500	1	1/12		1/12		
0	x_5						1	
			0		0		0	

$$48.000 - \frac{6 \cdot 42.000}{12}$$

		c_j	4	3	0	0	0	
c_k	x_k	**B**	A_1	A_2	A_3	A_4	A_5	b_i/a_{ij}
0	x_3	48.000	6	16	1			8.000
0	x_4	42.000	(12)	6		1		3.500
0	x_5	36.000	9	9			1	4.000
Z = 0			- 4	- 3	0	0	0	

0	x_3	27.000		13	1			
4	x_1	3.500	1	1/12		1/12		
0	x_5						1	
			0		0		0	

$$16 - \frac{6 \cdot 6}{12}$$

		c_j	4	3	0	0	0	
c_k	x_k	**B**	A_1	A_2	A_3	A_4	A_5	b_i/a_{ij}
0	x_3	48.000	6	16	1			8.000
0	x_4	42.000	(12)	6		1		3.500
0	x_5	36.000	9	9			1	4.000
Z = 0			- 4	- 3	0	0	0	

0	x_3	27.000		13	1	-1/2		
4	x_1	3.500	1	1/12		1/12		
0	x_5						1	
			0		0		0	

$$0 \quad - \quad \frac{1 \cdot 6}{12}$$

		c_j	4	3	0	0	0	
c_k	x_k	**B**	A_1	A_2	A_3	A_4	A_5	b_i/a_{ij}
0	x_3	48.000	6	16	1			8.000
0	x_4	42.000	(12)	6		1		3.500
0	x_5	36.000	9	9			1	4.000
Z = 0			- 4	- 3	0	0	0	

0	x_3	27.000		13	1	-1/2		
4	x_1	3.500	1	1/2		1/12		
0	x_5	4.500					1	
			0		0		0	

$$36.000 - \frac{9 \cdot 42.000}{12}$$

		c_j	4	3	0	0	0	
c_k	x_k	**B**	A_1	A_2	A_3	A_4	A_5	b_i/a_{ij}
0	x_3	48.000	6	16	1			8.000
0	x_4	42.000	(12)	6		1		3.500
0	x_5	36.000	9	9			1	4.000
Z = 0			- 4	- 3	0	0	0	

0	x_3	27.000		13	1	-1/2		
4	x_1	3.500	1	1/2		1/12		
0	x_5	4.500		9/2			1	
			0		0		0	

$$9 - \frac{6 \cdot 9}{12}$$

		c_j	4	3	0	0	0	
c_k	x_k	**B**	A_1	A_2	A_3	A_4	A_5	b_i/a_{ij}
0	x_3	48.000	6	16	1			8.000
0	x_4	42.000	(12)	6		1		3.500
0	x_5	36.000	9	9			1	4.000
Z = 0			- 4	- 3	0	0	0	

0	x_3	27.000		13	1	-1/2		
4	x_1	3.500	1	1/2		1/12		
0	x_5	4.500		9/2		-3/4	1	
			0		0		0	

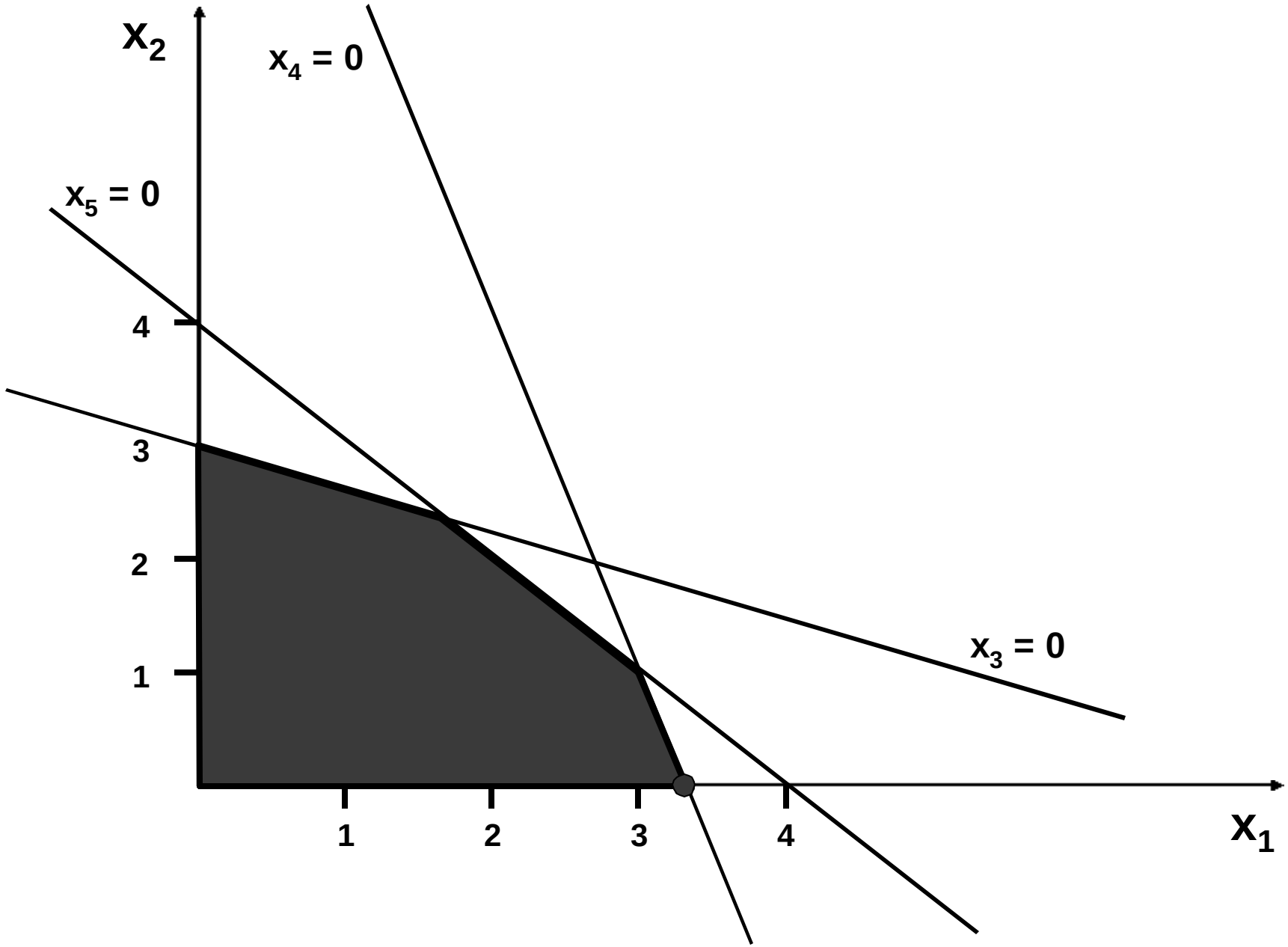
$$0 \quad - \quad \frac{1 \cdot 9}{12}$$

		c_j	4	3	0	0	0	
$\mathbf{c_k}$	$\mathbf{x_k}$	**B**	$\mathbf{A_1}$	$\mathbf{A_2}$	$\mathbf{A_3}$	$\mathbf{A_4}$	$\mathbf{A_5}$	b_i/a_{ij}
0	$\mathbf{x_3}$	48.000	6	16	1			8.000
0	$\mathbf{x_4}$	42.000	12	6		1		3.500
0	$\mathbf{x_5}$	36.000	9	9			1	4.000
Z = 0			- 4	- 3	0	0	0	

0	$\mathbf{x_3}$	27.000		13	1	-1/2		
4	$\mathbf{x_1}$	3.500	1	1/2		1/12		
0	$\mathbf{x_5}$	4.500		9/2		-3/4	1	
Z = 14.000			0		0		0	

		c_j	4	3	0	0	0	
$\mathbf{c_k}$	$\mathbf{x_k}$	**B**	$\mathbf{A_1}$	$\mathbf{A_2}$	$\mathbf{A_3}$	$\mathbf{A_4}$	$\mathbf{A_5}$	b_i/a_{ij}
0	$\mathbf{x_3}$	48.000	6	16	1			8.000
0	$\mathbf{x_4}$	42.000	12	6		1		3.500
0	$\mathbf{x_5}$	36.000	9	9			1	4.000
Z = 0			- 4	- 3	0	0	0	

0	$\mathbf{x_3}$	27.000		13	1	-1/2		
4	$\mathbf{x_1}$	3.500	1	1/2		1/12		
0	$\mathbf{x_5}$	4.500		9/2		-3/4	1	
Z = 14.000			0	-1	0	1/3	0	

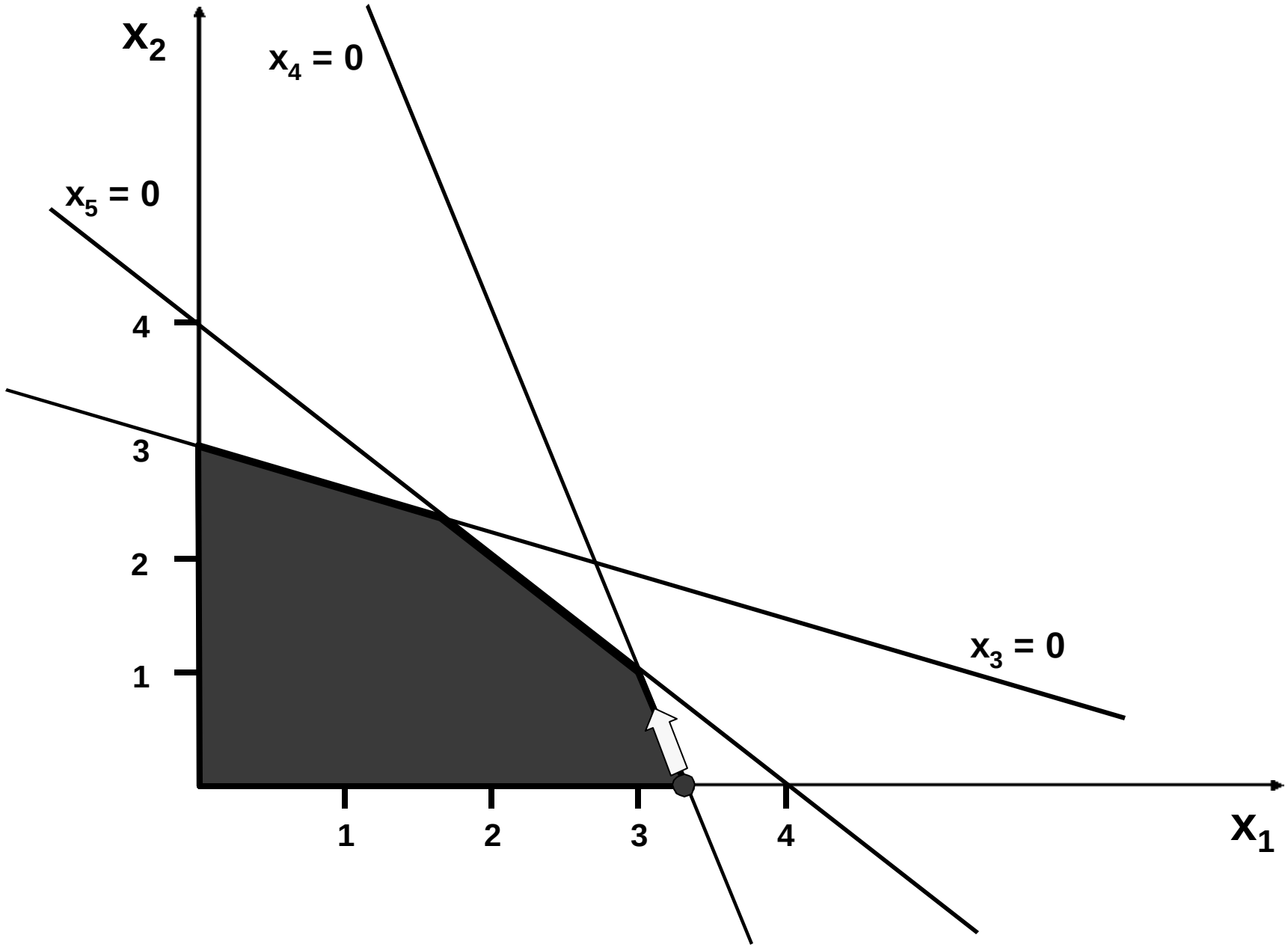

x_2
$x_4 = 0$
$x_5 = 0$
4
3
2
1
$x_3 = 0$
1
2
3
4
x_1

		c_j	4	3	0	0	0	
$\mathbf{c_k}$	$\mathbf{x_k}$	**B**	$\mathbf{A_1}$	$\mathbf{A_2}$	$\mathbf{A_3}$	$\mathbf{A_4}$	$\mathbf{A_5}$	b_i/a_{ij}
0	$\mathbf{x_3}$	48.000	6	16	1			8.000
0	$\mathbf{x_4}$	42.000	12	6		1		3.500
0	$\mathbf{x_5}$	36.000	9	9			1	4.000
Z = 0			- 4	- 3	0	0	0	

0	$\mathbf{x_3}$	27.000		13	1	-1/2		
4	$\mathbf{x_1}$	3.500	1	1/2		1/12		
0	$\mathbf{x_5}$	4.500		9/2		-3/4	1	
Z = 14.000			0	-1	0	1/3	0	

		c_j	4	3	0	0	0	
c_k	x_k	B	A_1	A_2	A_3	A_4	A_5	b_i/a_{ij}
0	x_3	48.000	6	16	1			8.000
0	x_4	42.000	12	6		1		3.500
0	x_5	36.000	9	9			1	4.000
Z = 0			- 4	- 3	0	0	0	

0	x_3	27.000		13	1	-1/2		
4	x_1	3.500	1	1/2		1/12		
0	x_5	4.500		9/2		-3/4	1	
Z = 14.000			0	-1	0	1/3	0	


x_2
$x_4 = 0$
$x_5 = 0$
4
3
2
1
$x_3 = 0$
1
2
3
4
x_1

		c_j	4	3	0	0	0	
$\mathbf{c_k}$	$\mathbf{x_k}$	**B**	$\mathbf{A_1}$	$\mathbf{A_2}$	$\mathbf{A_3}$	$\mathbf{A_4}$	$\mathbf{A_5}$	b_i/a_{ij}
0	$\mathbf{x_3}$	48.000	6	16	1			8.000
0	$\mathbf{x_4}$	42.000	12	6		1		3.500
0	$\mathbf{x_5}$	36.000	9	9			1	4.000
Z = 0			- 4	- 3	0	0	0	

0	$\mathbf{x_3}$	27.000		13	1	-1/2		2.077
4	$\mathbf{x_1}$	3.500	1	1/2		1/12		7.000
0	$\mathbf{x_5}$	4.500		9/2		-3/4	1	1.000
Z = 14.000			0	-1	0	1/3	0	

		c_j	4	3	0	0	0	
c_k	x_k	B	A_1	A_2	A_3	A_4	A_5	b_i/a_{ij}
0	x_3	48.000	6	16	1			8.000
0	x_4	42.000	12	6		1		3.500
0	x_5	36.000	9	9			1	4.000
Z = 0			- 4	- 3	0	0	0	
0	x_3	27.000		13	1	-1/2		2.077
4	x_1	3.500	1	1/2		1/12		7.000
0	x_5	4.500		9/2		-3/4	1	1.000
Z = 14.000			0	-1	0	1/3	0	

		c_j	4	3	0	0	0	
c_k	x_k	B	A_1	A_2	A_3	A_4	A_5	b_i/a_{ij}
0	x_3	48.000	6	16	1			8.000
0	x_4	42.000	12	6		1		3.500
0	x_5	36.000	9	9			1	4.000
Z = 0			- 4	- 3	0	0	0	

0	x_3	27.000		13	1	-1/2		2.077
4	x_1	3.500	1	1/2		1/12		7.000
0	x_5	4.500		9/2		-3/4	1	1.000
Z = 14.000			0	-1	0	1/3	0	

		c_j	4	3	0	0	0	
$\mathbf{c_k}$	$\mathbf{x_k}$	**B**	$\mathbf{A_1}$	$\mathbf{A_2}$	$\mathbf{A_3}$	$\mathbf{A_4}$	$\mathbf{A_5}$	b_i/a_{ij}
0	$\mathbf{x_3}$	48.000	6	16	1			8.000
0	$\mathbf{x_4}$	42.000	12	6		1		3.500
0	$\mathbf{x_5}$	36.000	9	9			1	4.000
Z = 0			- 4	- 3	0	0	0	

0	$\mathbf{x_3}$	27.000		13	1	-1/2		2.077
4	$\mathbf{x_1}$	3.500	1	1/2		1/12		7.000
0	$\mathbf{x_5}$	4.500		9/2		-3/4	1	1.000
Z = 14.000			0	-1	0	1/3	0	

	$\mathbf{x_3}$				1			
	$\mathbf{x_1}$		1					
	$\mathbf{x_2}$	1.000		1				
Z			0	0	0			

		c_j	4	3	0	0	0	
c_k	x_k	B	A_1	A_2	A_3	A_4	A_5	b_i/a_{ij}
0	x_3	48.000	6	16	1			8.000
0	x_4	42.000	12	6		1		3.500
0	x_5	36.000	9	9			1	4.000
Z = 0			- 4	- 3	0	0	0	
0	x_3	27.000		13	1	-1/2		2.077
4	x_1	3.500	1	1/2		1/12		7.000
0	x_5	4.500		9/2		-3/4	1	1.000
Z = 14.000			0	-1	0	1/3	0	
0	x_3				1			
4	x_1		1					
3	x_2	1.000		1		-1/6	2/9	
Z			0	0	0			

		c_j	4	3	0	0	0	
c_k	x_k	B	A_1	A_2	A_3	A_4	A_5	b_i/a_{ij}
0	x_3	48.000	6	16	1			8.000
0	x_4	42.000	12	6		1		3.500
0	x_5	36.000	9	9			1	4.000
Z = 0			- 4	- 3	0	0	0	

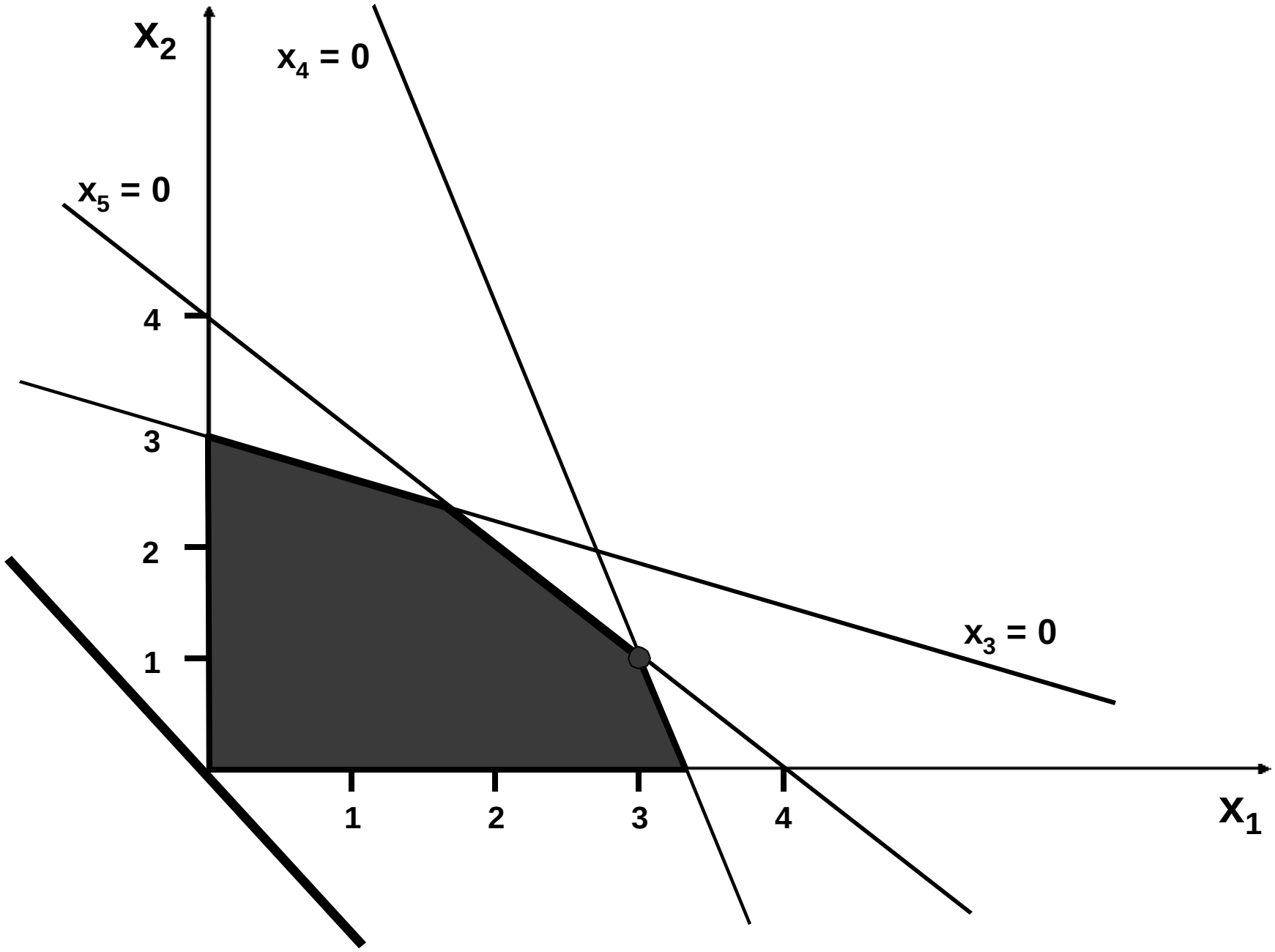
0	x_3	27.000		13	1	-1/2		2.077
4	x_1	3.500	1	1/2		1/12		7.000
0	x_5	4.500		9/2		-3/4	1	1.000
Z = 14.000			0	-1	0	1/3	0	

0	x_3	14.000			1	5/3	-26/9	
4	x_1	3.000	1			1/6	-1/9	
3	x_2	1.000		1		-1/6	2/9	
Z			0	0	0			

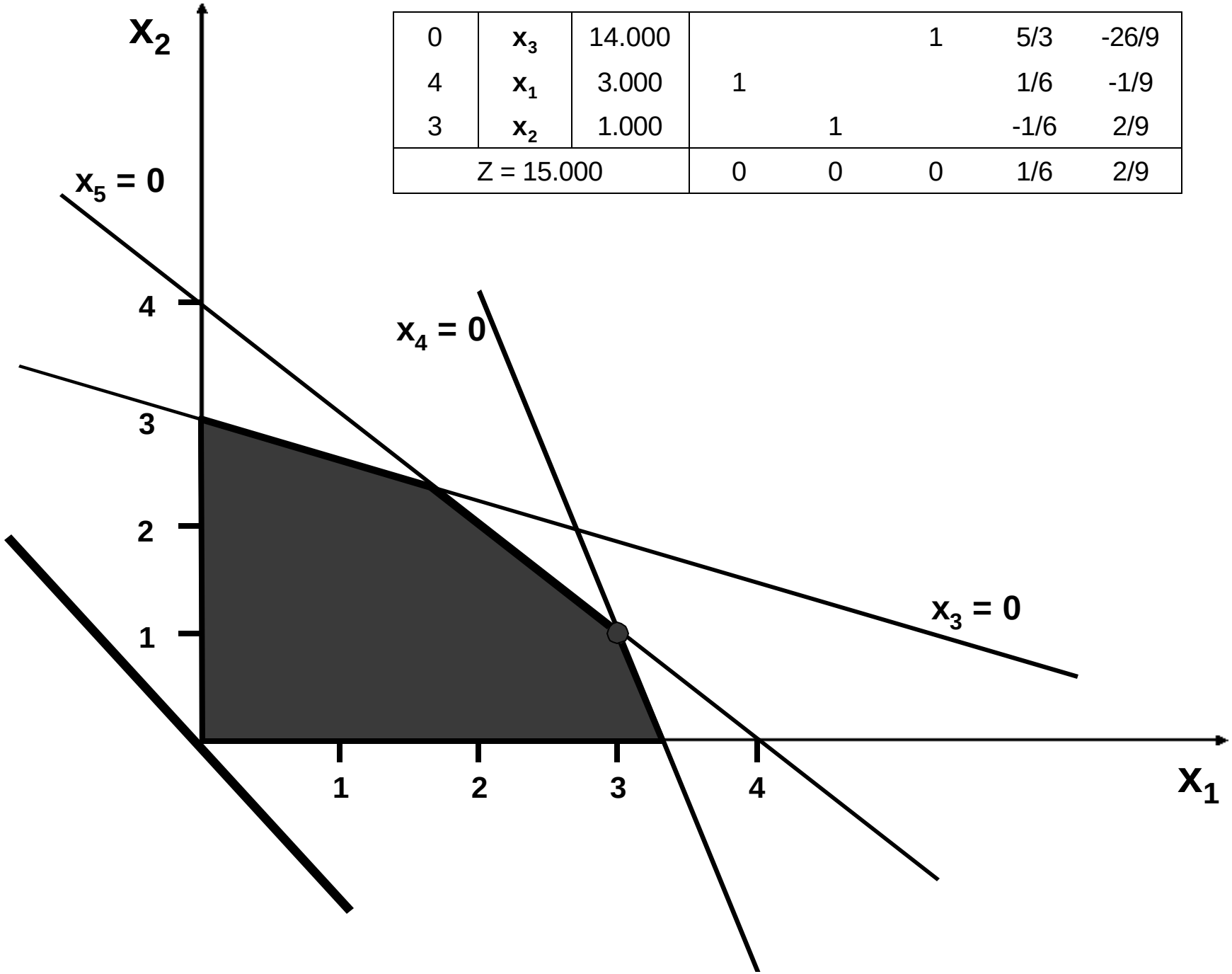
		c_j	4	3	0	0	0	
$\mathbf{c_k}$	$\mathbf{x_k}$	**B**	$\mathbf{A_1}$	$\mathbf{A_2}$	$\mathbf{A_3}$	$\mathbf{A_4}$	$\mathbf{A_5}$	b_i/a_{ij}
0	$\mathbf{x_3}$	48.000	6	16	1			8.000
0	$\mathbf{x_4}$	42.000	12	6		1		3.500
0	$\mathbf{x_5}$	36.000	9	9			1	4.000
Z = 0			- 4	- 3	0	0	0	

0	$\mathbf{x_3}$	27.000		13	1	-1/2		2.077
4	$\mathbf{x_1}$	3.500	1	1/2		1/12		7.000
0	$\mathbf{x_5}$	4.500		9/2		-3/4	1	1.000
Z = 14.000			0	-1	0	1/3	0	

0	$\mathbf{x_3}$	14.000			1	5/3	-26/9	
4	$\mathbf{x_1}$	3.000	1			1/6	-1/9	
3	$\mathbf{x_2}$	1.000		1		-1/6	2/9	
Z = 15.000			0	0	0	1/6	2/9	

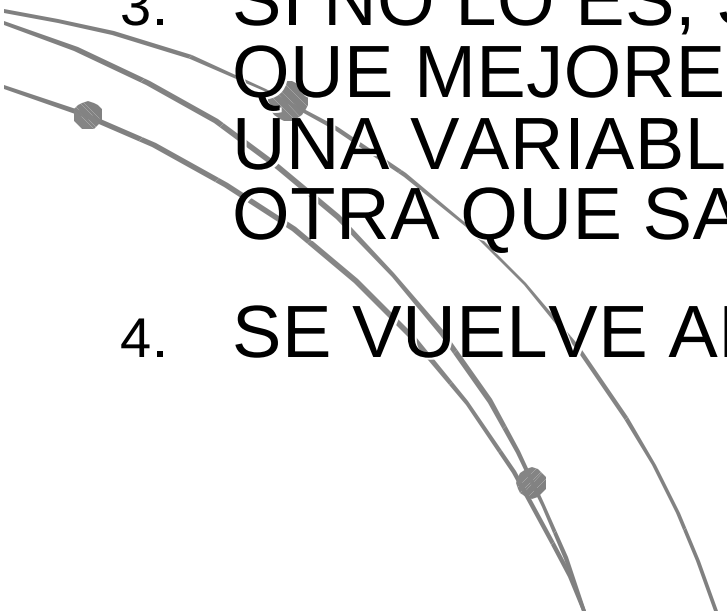

x_2
$x_4 = 0$
$x_5 = 0$
4
3
2
1
$x_3 = 0$
1
2
3
4
x_1

0	x_3	14.000			1	5/3	-26/9
4	x_1	3.000	1			1/6	-1/9
3	x_2	1.000		1		-1/6	2/9
Z = 15.000			0	0	0	1/6	2/9

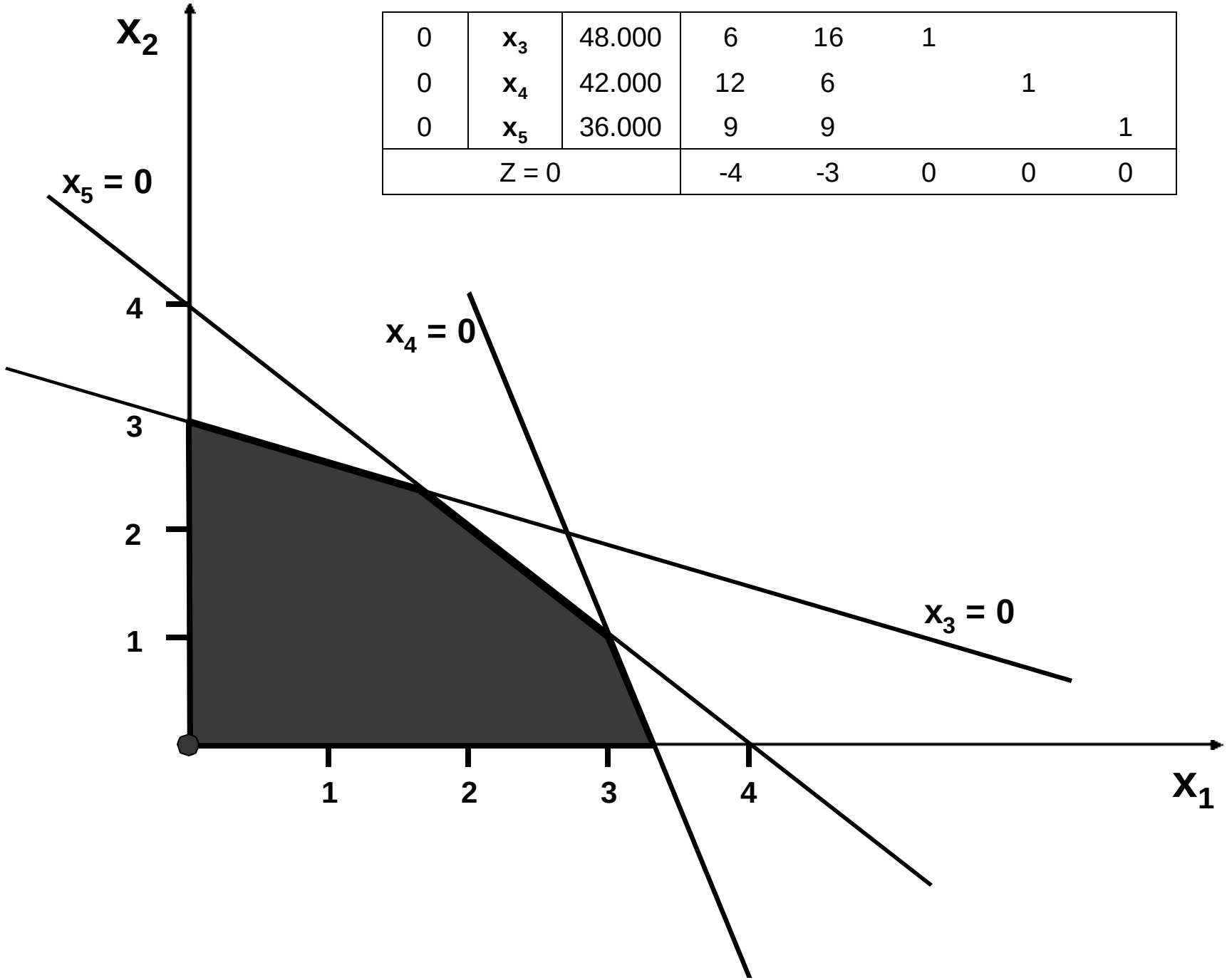


PROCEDIMIENTO “SIMPLEX”

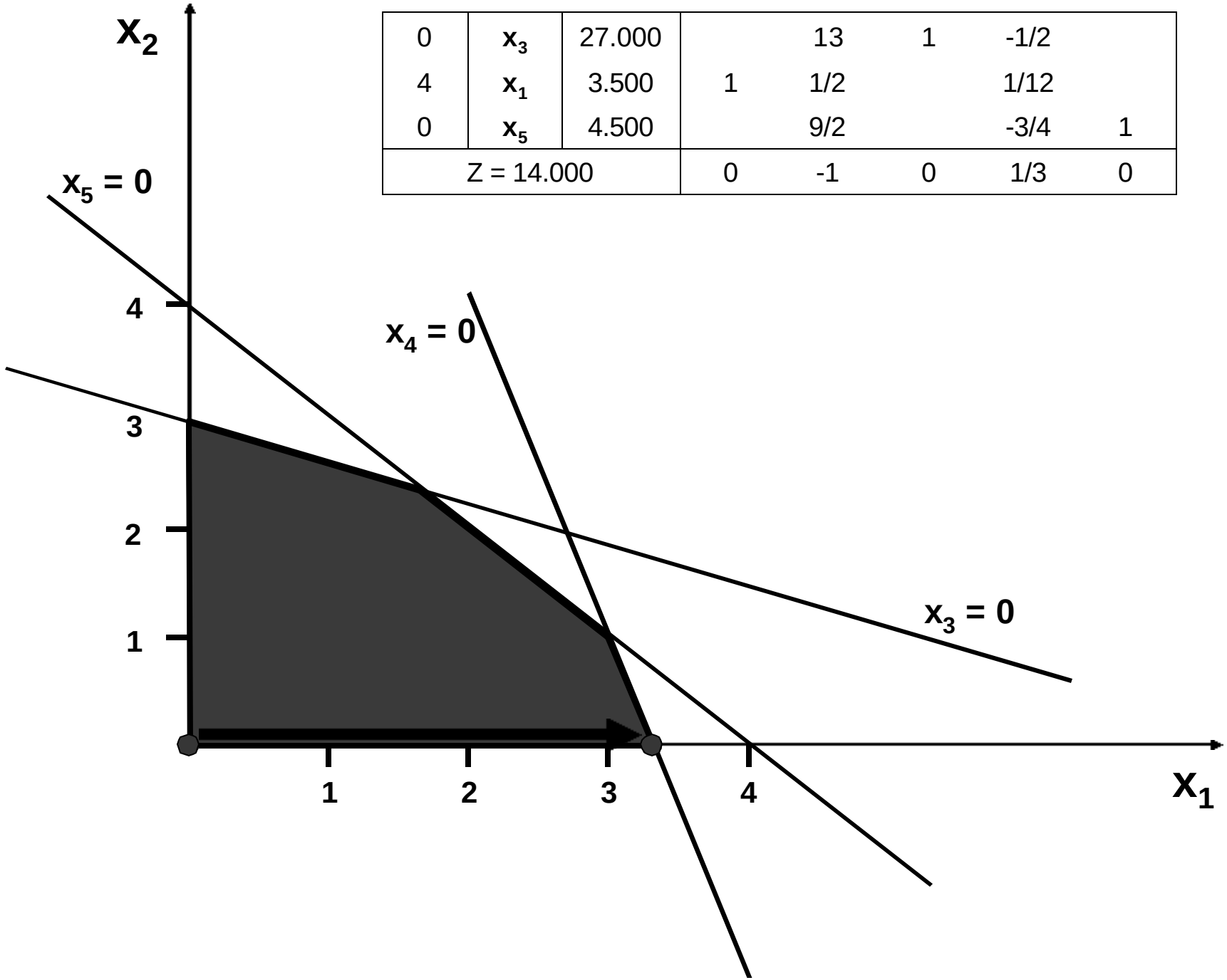
1. PARTE DE UNA BASE FACTIBLE, Y CALCULA EL Z
2. SE PREGUNTA SI LA SOLUCIÓN ES ÓPTIMA. SI LO ES SE TERMINA EL PROCEDIMIENTO.
3. SI NO LO ES, SE PASA A LA BASE VECINA QUE MEJORE MÁS A “Z”, SELECCIONANDO UNA VARIABLE QUE INGRESE A LA BASE Y OTRA QUE SALGA.
4. SE VUELVE AL PUNTO 2.



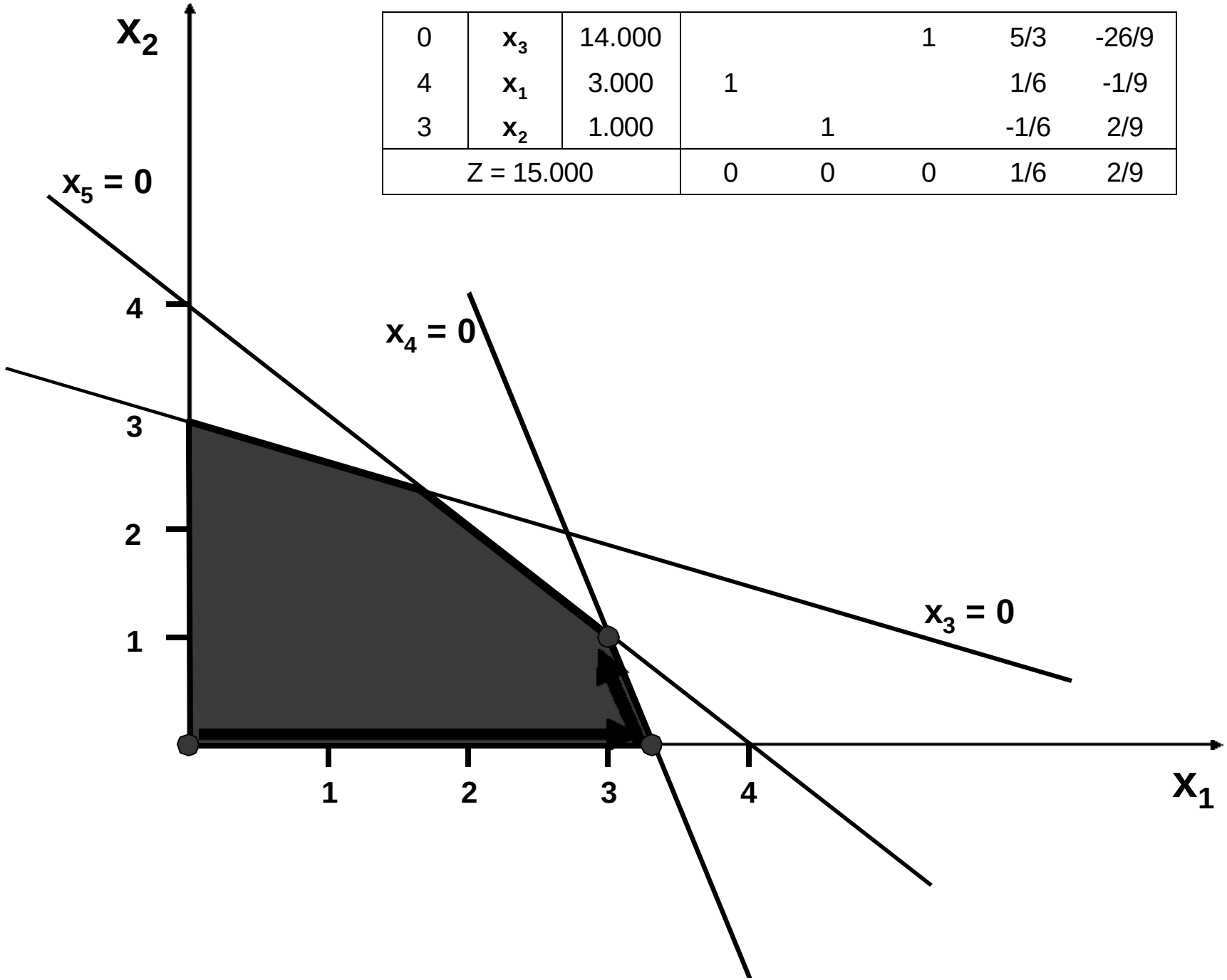
0	x_3	48.000	6	16	1			
0	x_4	42.000	12	6		1		
0	x_5	36.000	9	9			1	
Z = 0			-4	-3	0	0	0	

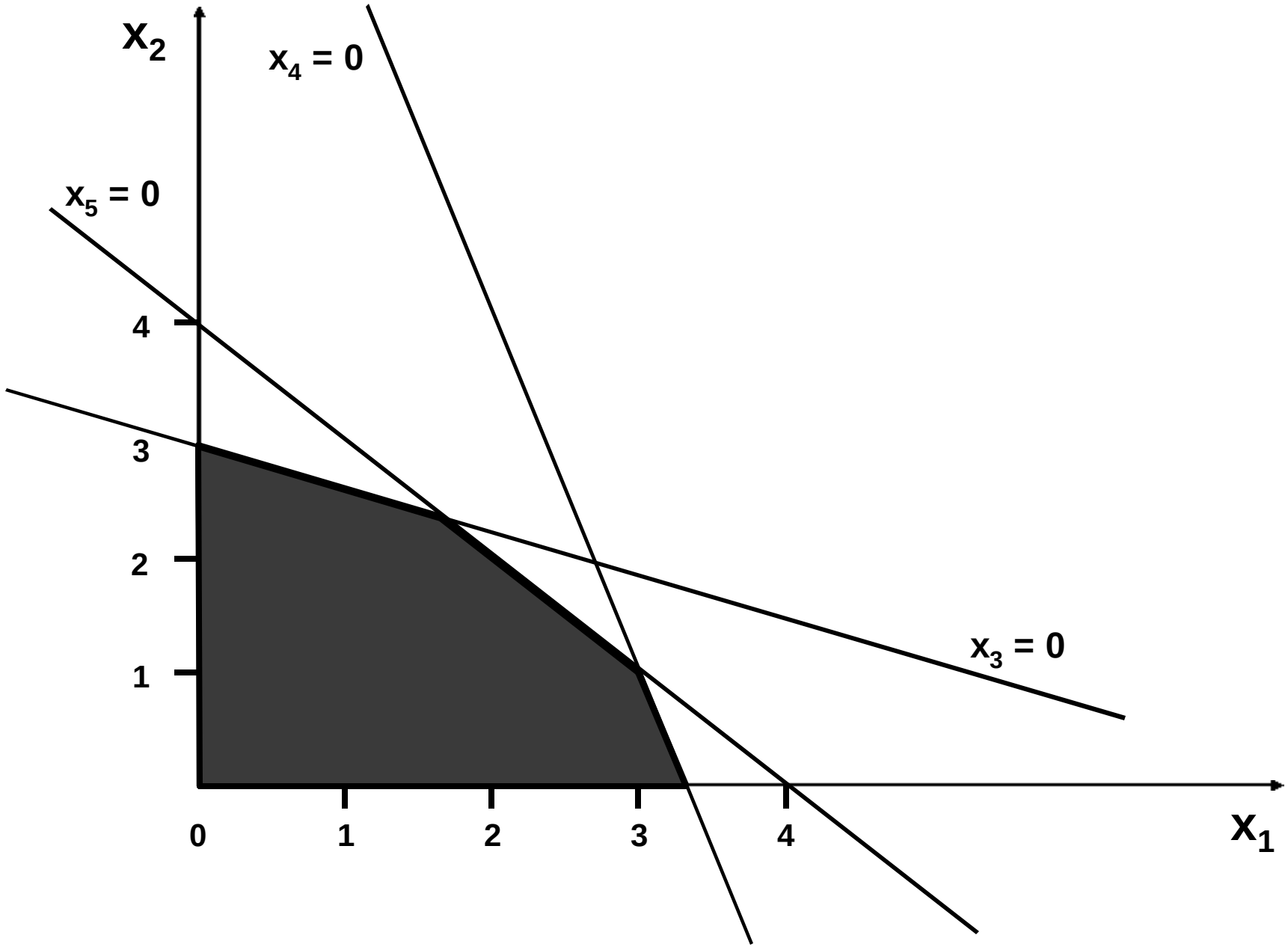


0	x_3	27.000		13	1	-1/2	
4	x_1	3.500	1	1/2		1/12	
0	x_5	4.500		9/2		-3/4	1
Z = 14.000			0	-1	0	1/3	0



0	x_3	14.000			1	5/3	-26/9
4	x_1	3.000	1			1/6	-1/9
3	x_2	1.000		1		-1/6	2/9
Z = 15.000			0	0	0	1/6	2/9




x2
x4 = 0
x5 = 0
4
3
2
1
x3 = 0
0
1
2
3
4
x1

SISTEMA DE INECUACIONES

$$\begin{cases} 6x_1 + 16x_2 \leq 48000 \\ 12x_1 + 6x_2 \leq 42000 \\ 9x_1 + 9x_2 \leq 36000 \end{cases}$$

$$Z = 4x_1 + 3x_2$$

SISTEMA DE ECUACIONES

$$\begin{cases} 6x_1 + 16x_2 + x_3 = 48000 \\ 12x_1 + 6x_2 + x_4 = 42000 \\ 9x_1 + 9x_2 + x_5 = 36000 \end{cases}$$

$$Z = 4x_1 + 3x_2 + 0x_3 + 0x_4 + 0x_5$$

FORMULACIÓN MATRICIAL DE LAS CONDICIONES DE VÍNCULO

$$\begin{cases} 6\,x_1 + 16\,x_2 + x_3 = 48.000 \\ 12\,x_1 + 6\,x_2 + x_4 = 42.000 \\ 9\,x_1 + 9\,x_2 + x_5 = 36.000 \end{cases}$$

$$Z = 4\,x_1 + 3\,x_2 + 0\,x_3 + 0\,x_4 + 0\,x_5$$

$$\begin{pmatrix} 6 & 16 & 1 & & \\ 12 & 6 & & 1 & \\ 9 & 9 & & & 1 \end{pmatrix} \cdot \begin{pmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \end{pmatrix} = \begin{pmatrix} 48.000 \\ 42.000 \\ 36.000 \end{pmatrix}$$

FORMULACIÓN MATRICIAL DEL FUNCIONAL

$$\begin{cases} 6x_1 + 16x_2 + x_3 = 48.000 \\ 12x_1 + 6x_2 + x_4 = 42.000 \\ 9x_1 + 9x_2 + x_5 = 36.000 \end{cases}$$

$$Z = 4x_1 + 3x_2 + 0x_3 + 0x_4 + 0x_5$$

$$Z = \begin{pmatrix} 4 & 3 & 0 & 0 & 0 \end{pmatrix} \cdot \begin{pmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \end{pmatrix}$$

DEFINICIÓN DE VECTORES

$$\begin{cases} 6x_1 + 16x_2 + x_3 = 48.000 \\ 12x_1 + 6x_2 + x_4 = 42.000 \\ 9x_1 + 9x_2 + x_5 = 36.000 \end{cases}$$

$$Z = 4x_1 + 3x_2 + 0x_3 + 0x_4 + 0x_5$$

$$A_1 = \begin{pmatrix} 6 \\ 12 \\ 9 \end{pmatrix} \quad A_2 = \begin{pmatrix} 16 \\ 6 \\ 9 \end{pmatrix} \quad A_3 = \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix} \quad A_4 = \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix} \quad A_5 = \begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix}$$

FORMULACIÓN VECTORIAL

$$\begin{cases} 6x_1 + 16x_2 + x_3 = 48.000 \\ 12x_1 + 6x_2 + x_4 = 42.000 \\ 9x_1 + 9x_2 + x_5 = 36.000 \end{cases}$$

$$Z = 4x_1 + 3x_2 + 0x_3 + 0x_4 + 0x_5$$

$$\begin{pmatrix} 6 \\ 12 \\ 9 \end{pmatrix} \cdot x_1 + \begin{pmatrix} 16 \\ 6 \\ 9 \end{pmatrix} \cdot x_2 + \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix} \cdot x_3 + \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix} \cdot x_4 + \begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix} \cdot x_5 = \begin{pmatrix} 48.000 \\ 42.000 \\ 36.000 \end{pmatrix}$$

FORMULACIÓN VECTORIAL

$$\begin{cases} 6x_1 + 16x_2 + x_3 = 48.000 \\ 12x_1 + 6x_2 + x_4 = 42.000 \\ 9x_1 + 9x_2 + x_5 = 36.000 \end{cases}$$

$$Z = 4x_1 + 3x_2 + 0x_3 + 0x_4 + 0x_5$$

$$A_1 \cdot x_1 + A_2 \cdot x_2 + A_3 \cdot x_3 + A_4 \cdot x_4 + A_5 \cdot x_5 = \begin{pmatrix} 48.000 \\ 42.000 \\ 36.000 \end{pmatrix}$$

FORMULACIÓN VECTORIAL

$$\begin{cases} 6x_1 + 16x_2 + x_3 = 48.000 \\ 12x_1 + 6x_2 + x_4 = 42.000 \\ 9x_1 + 9x_2 + x_5 = 36.000 \end{cases}$$

$$Z = 4x_1 + 3x_2 + 0x_3 + 0x_4 + 0x_5$$

$$\sum A_j \cdot x_j = B$$

$$\begin{cases} x_3 = b_1 \\ x_4 = b_2 \\ x_5 = b_3 \end{cases}$$

$$B = \begin{pmatrix} x_3 \\ x_4 \\ x_5 \end{pmatrix} = \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix} x_3 + \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix} x_4 + \begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix} x_5 = \begin{pmatrix} b_1 \\ b_2 \\ b_3 \end{pmatrix}$$

$$\boxed{B = \sum_{1}^{m} A_k x_k}$$

$$Z = c_1 x_1 + c_2 x_2 + c_3 x_3 + c_4 x_4 + c_5 x_5$$

$$Z^{(1)} = c_3\, x_3 + c_4\, x_4 + c_5 x_5$$

$$Z^{(1)} = \sum_{1}^{m} c_k x_k$$

$$A_1 = \begin{pmatrix} a_{11} \\ a_{21} \\ a_{31} \end{pmatrix} = a_{11}\begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix} + a_{21}\begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix} + a_{31}\begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix}$$

$$A_2 = \begin{pmatrix} a_{12} \\ a_{22} \\ a_{32} \end{pmatrix} = a_{12}\begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix} + a_{22}\begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix} + a_{32}\begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix}$$

$$A_j = \sum_{1}^{m} a_{ij} A_k$$

Cambio de base

$$\begin{cases} a_{11}x_1 + x_3 = b_1 \\ a_{21}x_1 + x_4 = b_2 \\ a_{31}x_1 + x_5 = b_3 \end{cases}$$

$$\begin{cases} x_3 = b_1 - a_{11}x_1 \geq 0 \\ x_4 = b_2 - a_{21}x_1 \geq 0 \\ x_5 = b_3 - a_{31}x_1 \geq 0 \end{cases}$$

$$\begin{cases} x_1 \leq \dfrac{b_1}{a_{11}} \\ x_1 \leq \dfrac{b_2}{a_{21}} \\ x_1 \leq \dfrac{b_3}{a_{31}} \end{cases}$$

$$x_1 = \min \frac{b_i}{a_{ij}} = \theta$$

Nueva base

$$\begin{cases} a_{11}\theta + x_3 = b_1 \\ a_{21}\theta + x_4 = b_2 \\ a_{31}\theta + x_5 = b_3 \end{cases}$$

$$A_j = \sum_1^m a_{ij} A_k \qquad \theta A_j = \theta \sum_1^m a_{ij} A_k$$

$$B = \sum_1^m A_k x_k \qquad B = \sum_1^m A_k x_k + \theta A_j - \theta \sum_1^m a_{ij} A_k$$

$$B = A_j \theta + \sum_1^m A_k (x_k - \theta a_{ij})$$

$$Z^{(2)} = c_j \theta + \sum_1^m c_k (x_k - \theta a_{ij})$$

$$Z^{(2)} = c_j\,\theta + \sum_{1}^{m} c_k (x_k - \theta\, a_{ij})$$

$$Z^{(2)} = c_j\,\theta + \sum_{1}^{m} c_k x_k - \sum_{1}^{m} \theta\, c_k a_{ij}$$

$$Z^{(2)} = c_j\,\theta + Z^{(1)} - \sum_{1}^{m} \theta\, c_k a_{ij}$$

$$Z^{(2)} = Z^{(1)} - \theta \left[\sum_{1}^{m} c_k a_{ij} - c_j \right]$$

$$Z^{(2)} = Z^{(1)} - \theta \cdot \left(z_j - c_j \right)$$

$$Z^{(P+1)} = Z^{(P)} - \theta \cdot \left(z_j - c_j \right)$$