

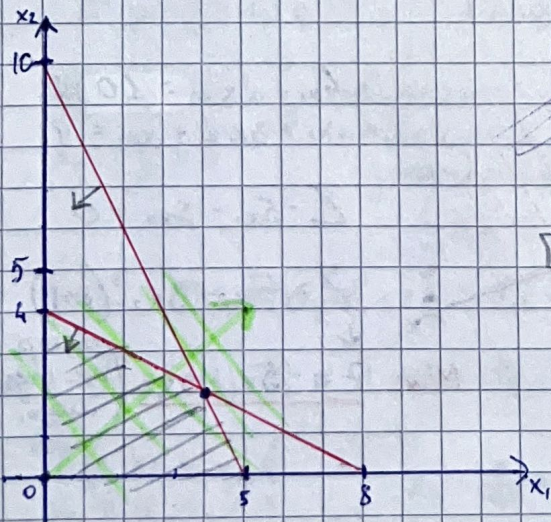
Nº 6

Maximize: $Z = 5x_1 + 4x_2$

$$x_1 + 2x_2 \leq 8$$

$$x_1, x_2 \geq 0$$

$$3x_1 + x_2 \leq 10$$



$$x_1 + 2x_2 + x_3 = 8$$

$$3x_1 + x_2 + x_4 = 10$$

B	x_1	x_2	x_3	x_4	
x_3	1	2	1	0	8
x_4	$1\frac{1}{3}$	0	$\frac{1}{3}$	$\frac{10}{3}$	
Z	0	$-\frac{8}{3}$	0	5	$\frac{50}{3}$

B	x_1	x_2	x_3	x_4	b
x_3	1	2	1	0	8
x_4	3	1	0	1	10
Z	-5	-4	0	0	0

B	x_1	x_2	x_3	x_4	
x_3	0	$\frac{1}{3}$	$\frac{2}{3}$	$-\frac{1}{3}$	$\frac{14}{3}$
x_4	1	$\frac{1}{3}$	0	$\frac{1}{3}$	$\frac{10}{3}$
Z	0	0	$-\frac{24}{15}$	$-\frac{8}{15}$	$29\frac{7}{15}$

$$x_2^* = (1, \frac{1}{3}, 0, \frac{1}{3}, \frac{10}{3})$$

$$x_1 + 2x_2 + x_3 = 8$$

$$x_3, x_4 \geq 0$$

$$3x_1 + x_2 + x_4 = 10$$

B	x_1	x_2	x_3	x_4	b
x_3	1	2	1	0	8
x_4	3	1	0	1	10
Z	-5	-4	0	0	0

$$\Rightarrow$$

B	x_1	x_2	x_3	x_4	b
x_3	0	$\frac{5}{3}$	1	$-\frac{1}{3}$	$\frac{14}{3}$
x_4	1	$\frac{1}{3}$	0	$\frac{1}{3}$	$\frac{10}{3}$
Z	0	$-\frac{7}{3}$	0	$\frac{5}{3}$	$\frac{50}{3}$

$$\Rightarrow$$

B	x_1	x_2	x_3	x_4	b
x_3	0	1	$\frac{3}{5}$	$-\frac{3}{5}$	$\frac{14}{5}$
x_4	1	$\frac{1}{3}$	0	$\frac{1}{3}$	$\frac{10}{3}$
Z	0	0	$\frac{4}{3}$	$\frac{5}{3}$	$23\frac{1}{5}$

$$x_2 = \frac{14}{5}$$

$$x_1 = \frac{10}{3} - \frac{14}{5} = \frac{12}{5}$$

$$Z = 5 \cdot \frac{12}{5} + 4 \cdot \frac{14}{5} = 12 + 11,2 = 23,2$$

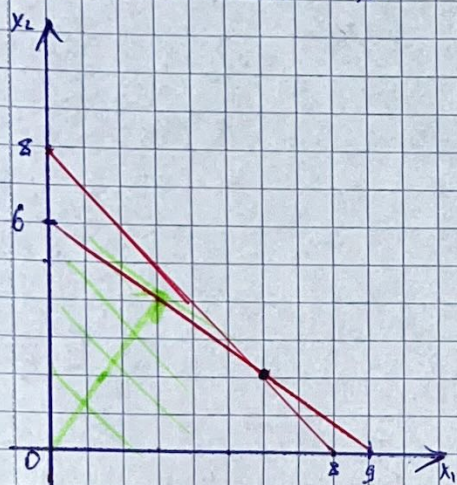
$$\text{B-gab: } x_1 = \frac{12}{5} \quad x_2 = \frac{14}{5} \quad Z = 23,2$$

$$\text{N.B. Max } Z = 3x_1 + 4x_2$$

$$2x_1 + 3x_2 \leq 18$$

$$x_1 + x_2 \leq 8$$

$$x_1, x_2 \geq 0$$



$$2x_1 + 3x_2 + x_3 = 18$$

$$x_1 + x_2 + x_4 = 8$$

$$x_3, x_4 \geq 0$$

B	x_1	x_2	x_3	x_4	b
x_3	2	3	1	0	18
x_4	1	1	0	1	8
Z	-3	-4	0	0	0

B	x_1	x_2	x_3	x_4	b
x_3	$\frac{2}{3}$	1	$\frac{1}{3}$	0	6
x_4	$\frac{1}{3}$	0	$-\frac{1}{3}$	1	2
Z	$\frac{1}{3}$	0	$\frac{4}{3}$	0	24

B	x_1	x_2	x_3	x_4	b
x_3	$\frac{2}{3}$	1	$\frac{1}{3}$	0	6
x_4	1	0	-1	1	8
Z	0	0	1	0	26

$$x_1 = 6$$

$$x_2 = 6 - 4 = 2$$

$$Z = 3 \cdot 6 + 2 \cdot 4 = 18 + 8 = 26$$

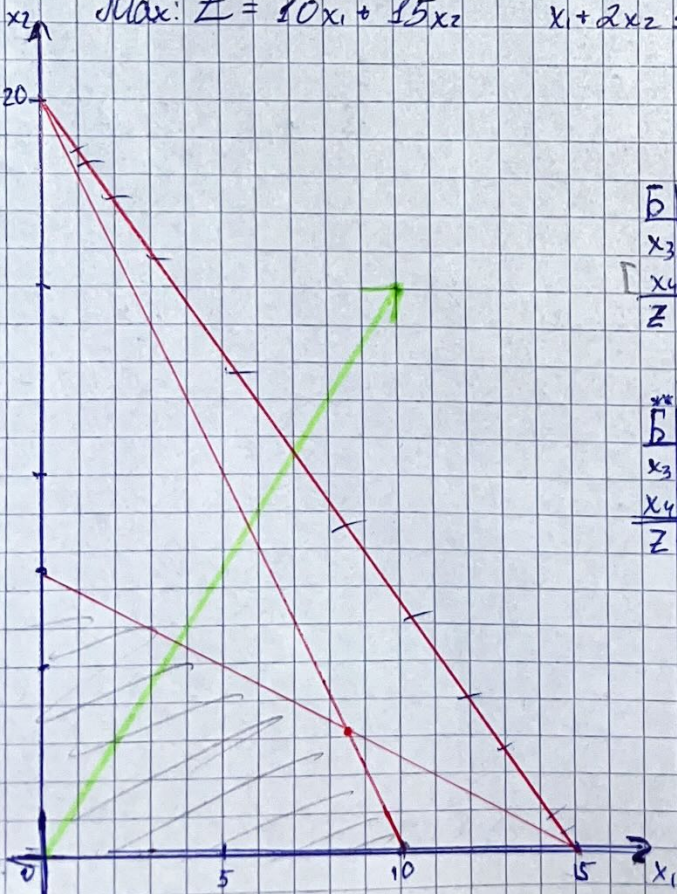
$$\text{B-gab: } x_1 = 6 \quad x_2 = 2 \quad Z = 26$$

$$\text{N.B. Max: } Z = 10x_1 + 15x_2$$

$$2x_1 + x_2 \leq 20$$

$$x_1 + 2x_2 \leq 15$$

$$x_1, x_2 \geq 0$$



$$2x_1 + x_2 + x_3 = 20$$

$$x_1 + 2x_2 + x_4 = 15$$

$$x_3, x_4 \geq 0$$

B	x_1	x_2	x_3	x_4	b
x_3	2	1	1	0	20
x_4	1	2	0	1	15
Z	-10	-15	0	0	0

B	x_1	x_2	x_3	x_4	b
x_3	$\frac{3}{2}$	0	1	$-\frac{1}{2}$	$\frac{25}{2}$
x_4	$\frac{1}{2}$	1	0	$\frac{1}{2}$	$\frac{15}{2}$
Z	$-\frac{5}{2}$	0	0	$\frac{15}{2}$	$\frac{225}{2}$

B	x_1	x_2	x_3	x_4	b
x_3	1	0	$\frac{2}{3}$	$-\frac{1}{3}$	$\frac{25}{3}$
x_4	$\frac{1}{2}$	1	0	$\frac{1}{2}$	$\frac{15}{2}$
Z	0	0	$\frac{5}{3}$	$\frac{40}{3}$	$133\frac{1}{3}$

$$x_1 = \frac{25}{3}$$

$$x_2 = \frac{15}{2} - \frac{25}{6} = \frac{20}{6} = \frac{10}{3}$$

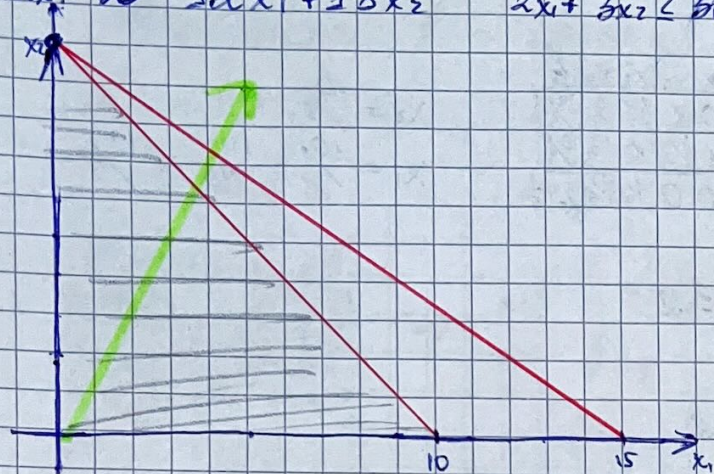
$$\text{B-gab: } x_1 = \frac{25}{3} \quad x_2 = \frac{10}{3} \quad Z = 133\frac{1}{3}$$

Nº 12

Max: $Z = 12x_1 + 18x_2$

$$\begin{aligned} x_1 + x_2 &\leq 10 \\ 2x_1 + 3x_2 &\leq 30 \end{aligned}$$

$$x_1, x_2 \geq 0$$



$$\begin{aligned} x_1 + x_2 + x_3 &= 10 \\ 2x_1 + 3x_2 + x_4 &= 30 \end{aligned}$$

B	x_1	x_2	x_3	x_4	b
x_3	1	1	1	0	10
x_4	2	3	0	1	30
Z	12	18	0	0	0

B*	x_1	x_2	x_3	x_4	b
x_3	1	1	1	0	10
x_4	2	3	0	1	30
Z	0	0	6	180	

$$\begin{cases} x_1 + x_2 = 10 \\ 2x_1 + 3x_2 = 30 \end{cases}$$

$$\begin{cases} x_1 = 10 - x_2 \\ 20 - 2x_2 + 3x_2 = 30 \end{cases}$$

$$\begin{cases} x_1 = 10 - x_2 \\ x_2 = 10 \end{cases} \quad \begin{cases} x_1 = 0 \\ x_2 = 10 \end{cases}$$

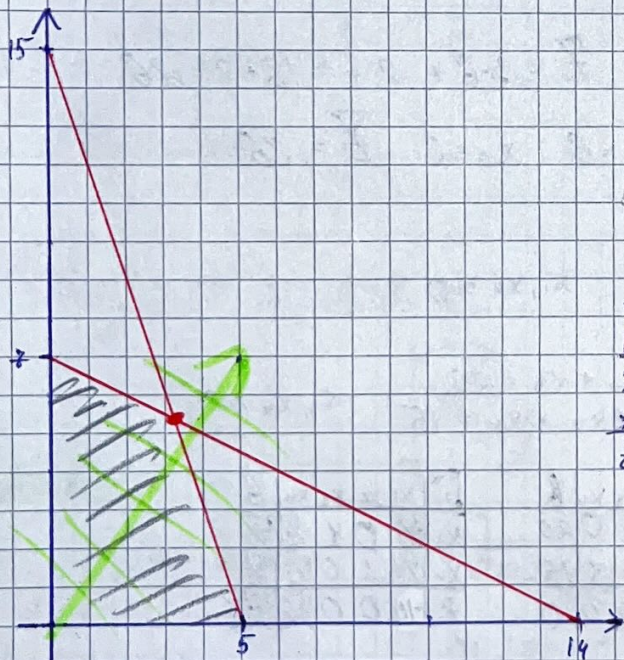
B-ges: $x_1 = 0, x_2 = 10, Z = 180$

Nº 14

Max: $Z = 5x_1 + 7x_2$

$$\begin{aligned} x_1 + 2x_2 &\leq 14 \\ 3x_1 + x_2 &\leq 15 \end{aligned}$$

$$x_1, x_2 \geq 0$$



$$\begin{aligned} x_1 + 2x_2 + x_3 &= 14 \\ 3x_1 + x_2 + x_4 &= 15 \end{aligned}$$

B	x_1	x_2	x_3	x_4	b
x_3	1	2	1	0	14
x_4	3	1	0	1	15
Z	5	7	0	0	0

B*	x_1	x_2	x_3	x_4	b
x_3	1/2	1	1/2	0	7
x_4	5/2	0	-1/2	1	8
Z	3/2	0	3/2	0	49

B*	x_1	x_2	x_3	x_4	b
x_2	1/2	1	1/2	0	7
x_4	1	0	-1/5	2/5	16/5
Z	0	0	16/5	3/5	53.8

$$\begin{aligned} x_1 &= \frac{16}{5} \\ x_2 &= \frac{27}{5} \Rightarrow Z = 53.8 \end{aligned}$$

B-ges: $x_1 = \frac{16}{5}, x_2 = \frac{27}{5}, Z = 53.8$