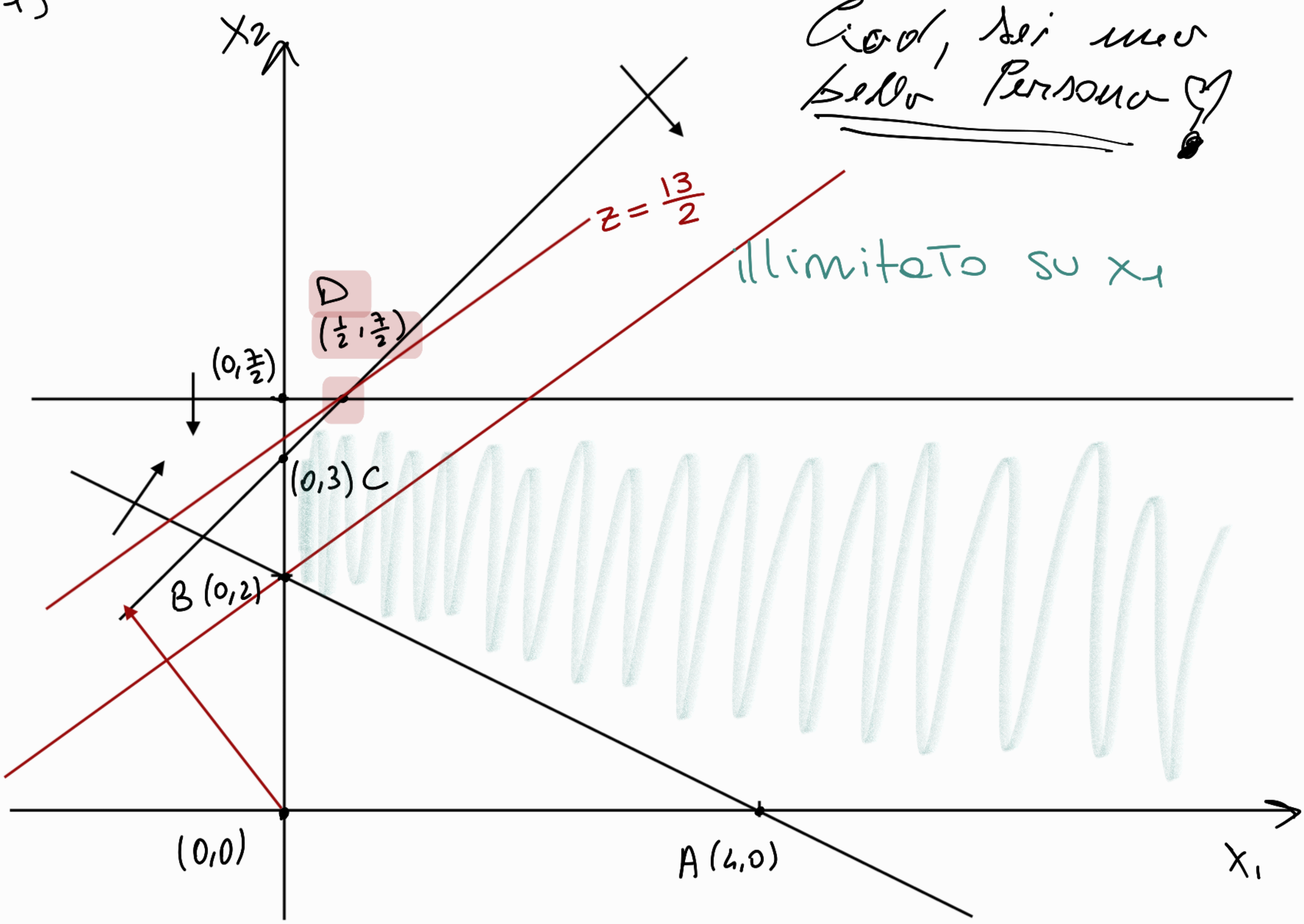
Domande:

1. Risolvere con metodo grafico
2. Trasformare il probl3ma in forma standard
3. Elencare tutte le basi ammissibili del problema standardizzato
4. Risolvere con simplesso partendo dal vertice (0,2).

$$\max \quad z = -x_1 + 2x_2$$

$$\begin{aligned} x_1 + 2x_2 &\geq 4 \qquad & y &= -\tfrac{1}{2}x + 2 \\ -x_1 + x_2 &\leq 3 & y &= x + 3 \\ 2x_2 &\leq 7 & y &= \tfrac{7}{2} \\ x_1, x_2 &\geq 0 \end{aligned}$$

1)



2) $\max \quad z = -x_1 + 2x_2$

$$\begin{aligned} x_1 + 2x_2 - x_3 \quad\quad\quad &= 4 \\ -x_1 + x_2 \quad\quad + x_4 \quad\quad &= 3 \\ 2x_2 \quad\quad\quad + x_5 &= 7 \end{aligned}$$

$$x_1, \text{——}, x_5 \geq 0$$

3)

$A(4,0) \longrightarrow$

$$\begin{aligned} 4 - x_3 = 4 &\Rightarrow x_3 = 0 \\ -4 + x_4 = 3 &\Rightarrow x_4 = 7 \\ x_5 = 7 &\Longrightarrow B\{x_1, x_4, x_5\} \end{aligned}$$

$B(0,2) \longrightarrow$

$$\begin{aligned} 4 - x_3 = 4 &\Rightarrow x_3 = 0 \\ 2 + x_4 = 3 &\Rightarrow x_4 = 5 \\ 4 + x_5 = 7 &\Rightarrow x_5 = 3 \\ &\Rightarrow B\{x_2, x_4, x_5\} \end{aligned}$$

$C(0,3) \longrightarrow \{x_2, x_3, x_5\}$

$D\left(\frac{1}{2}, \frac{7}{2}\right) \longrightarrow \{x_1, x_2, x_3\}$

4)

$$\begin{array}{c} x_2 \\ x_4 \\ x_5 \end{array}\left[\begin{array}{ccccc|c} 1 & \boxed{2} & -1 & 0 & 0 & 4 \\ -1 & 1 & 0 & 1 & 0 & 3 \\ 0 & 2 & 0 & 0 & 1 & 7 \end{array}\right] \quad \begin{array}{l} R_2 = R_2 - \frac{1}{2}R_1 \\ R_3 = R_3 - R_1 \\ R_1 = \frac{1}{2}R_1 \end{array}$$

$$\left[\begin{array}{ccccc|c} \frac{1}{2} & 1 & -\frac{1}{2} & 0 & 0 & 2 \\ -\frac{3}{2} & 0 & \frac{1}{2} & 1 & 0 & 1 \\ -1 & 0 & 1 & 0 & 1 & 3 \end{array}\right] \begin{array}{l} 2 \longrightarrow \text{esce } x_4 \\ \\ 3 \end{array}$$

$$x_2 = 2 - \frac{1}{2}x_1 + \frac{1}{2}x_3$$
$$x_4 = 1 + \frac{3}{2}x_1 - x_3$$
$$x_5 = 3 + x_1 - x_3$$

max
$$z = 4 - 2x_1 + \underbrace{x_3}_{\uparrow\ \text{entra}}$$

$$\begin{array}{c} x_2 \\ x_3 \\ x_5 \end{array}\left[\begin{array}{ccccc|c} \frac{1}{2} & 1 & -\frac{1}{2} & 0 & 0 & 2 \\ -\frac{3}{2} & 0 & \boxed{\frac{1}{2}} & 1 & 0 & 1 \\ -1 & 0 & 1 & 0 & 1 & 3 \end{array}\right] \quad \begin{array}{l} R_1 = R_1 + R_2 \\ R_2 = 2R_2 \\ R_3 = R_3 - R_2 \end{array}$$

$$\left[\begin{array}{ccccc|c} -1 & 1 & 0 & 1 & 0 & 3 \\ -3 & 0 & 1 & 2 & 0 & 2 \\ 2 & 0 & 0 & -2 & 1 & 1 \end{array}\right] \begin{array}{l} \\ \\ 1/2 \quad \text{esce } x_5 \end{array}$$

$$x_2 = 3 + x_1 - x_4$$
$$x_3 = 2 + 3x_1 - 2x_4$$
$$x_5 = 1 - 2x_1 + 2x_4$$

max
$$z = 6 + \underbrace{x_1}_{\text{entra}} - 2x_4$$

$$\begin{array}{c} x_2 \\ x_3 \\ x_1 \end{array} \left[\begin{array}{ccccc|c} -1 & 1 & 0 & 1 & 0 & 3 \\ -3 & 0 & 1 & 2 & 0 & 2 \\ \boxed{2} & 0 & 0 & -2 & 1 & 1 \end{array}\right] \qquad \begin{array}{l} R_1 = R_1 + \frac{1}{2} R_3 \\ R_2 = R_2 + \frac{3}{2} R_3 \\ R_3 = \frac{1}{2} R_3 \end{array}$$

$$\left[\begin{array}{ccccc|c} 0 & 1 & 0 & 0 & \frac{1}{2} & \frac{7}{2} \\ 0 & 0 & 1 & -1 & \frac{3}{2} & \frac{7}{2} \\ 1 & 0 & 0 & -1 & \frac{1}{2} & \frac{1}{2} \end{array}\right]$$

$$x_2 = \frac{7}{2} - \frac{1}{2} x_5$$

$$x_3 = \frac{7}{2} + x_4 - \frac{3}{2} x_5$$

$$x_1 = \frac{1}{2} + x_4 - \frac{1}{2} x_5$$

$$\max \quad z = \underline{\underline{\frac{13}{2}}} - x_4 - \frac{1}{2} x_5$$

$$\hookrightarrow z = \frac{13}{2}$$