

Exercice 1

- ① a) $\mathcal{D}(x_D, y_D)$ point d'intersection de $\Delta_1: x+2y=3$
et $\Delta_2: 6x+8y=15$

$$\begin{cases} 6x+12y=18 \\ 6x+8y=15 \end{cases}$$

$$\underline{4y=3} \quad y_D = \frac{3}{4} \quad \text{d'où} \quad x_D = 3 - 2y = 3 - 2 \times \frac{3}{4} = \frac{3}{2}$$

$$\underline{\mathcal{D}\left(\frac{3}{2}, \frac{3}{4}\right)}$$

⑤ $E = \{(0,0), (1,0), (2,0), (0,1), (1,1)\}$

⑥ Solution du problème RP :

$$f_{\max} = 3 \times \frac{3}{2} + 5 \times \frac{3}{4} = \frac{18+15}{4} = \frac{33}{4} \quad \text{par } (x,y) = \left(\frac{3}{2}, \frac{3}{4}\right)$$

⑦ $f_{\max}(E) = \frac{33}{4}$

⑧ $h(E) = \frac{33}{4}$

$U=0$. On sépare E en 2 : $F_1 = E \cap \{y=0\}$
 $F_2 = E \cap \{y=1\}$

E — $F_1: h(F_1) = f(2,0) = 3 \times 2 + 5 \times 0 = 6$: on élimine et $\underline{U=6}$

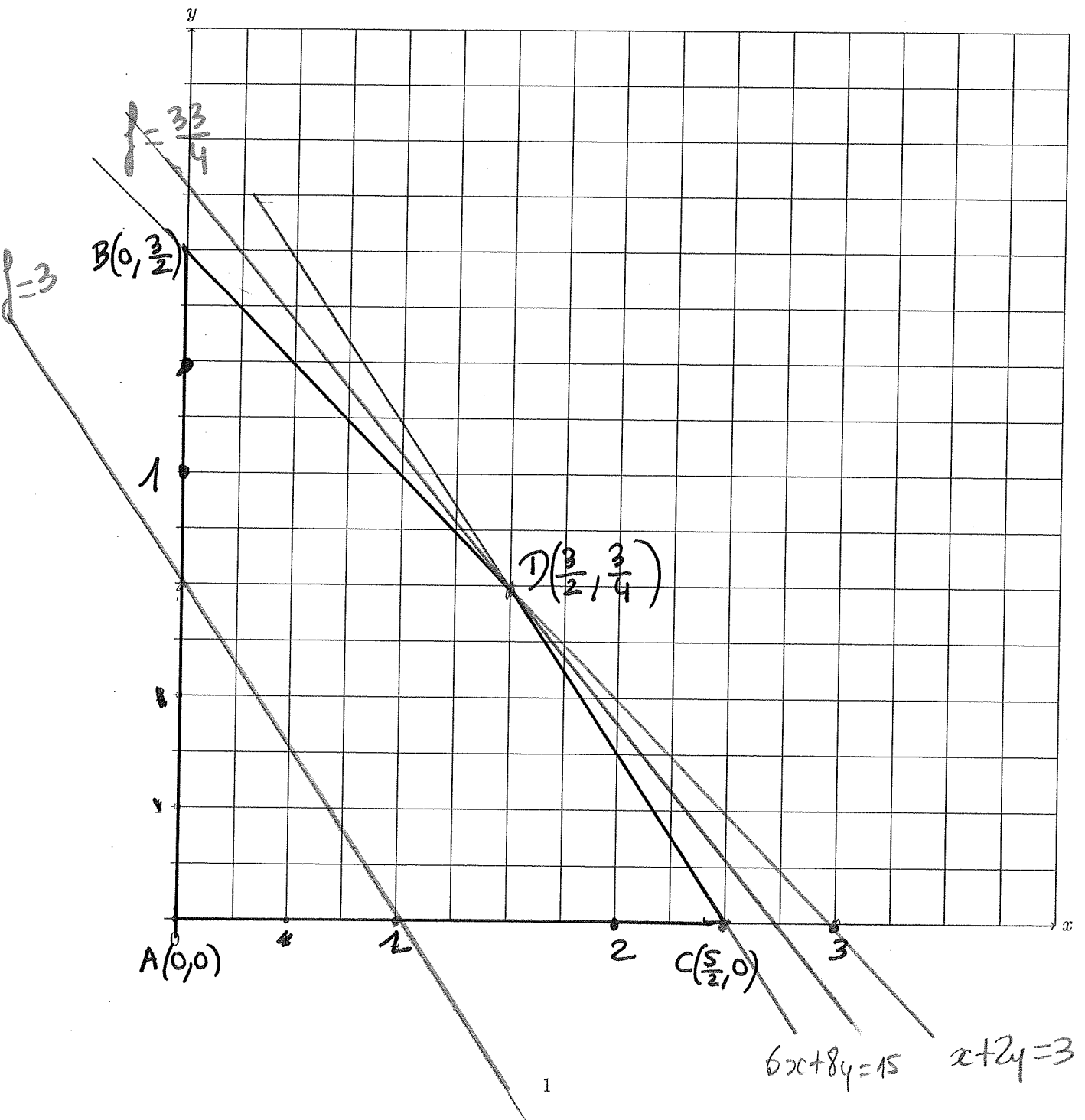
— $F_2: h(F_2) = f(1,1) = 3 \times 1 + 5 \times 1 = 8 > U$: $\underline{U=8}$ et on élimine

Solution du problème P: $f_{\max} = 8$ par $(x,y) = (1,1)$

NOM :

PRENOM :

Graphique de l'exercice 1



Exercice 2

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① voir feuille suivante

$$\textcircled{2} \quad A \begin{pmatrix} 0 \\ 5 \end{pmatrix} \quad \begin{array}{l} 0 + 3 \times 5 \leq 15 \\ 7 \times 0 + 5 \times 5 \leq 49 \end{array} \quad \left| \quad B \begin{pmatrix} 3 \\ 4 \end{pmatrix} \quad \begin{array}{l} 3 + 3 \times 4 \leq 15 \\ 7 \times 3 + 5 \times 4 \leq 49 \end{array} \right.$$

$$C \begin{pmatrix} \frac{34}{7} \\ 3 \end{pmatrix} \quad \begin{array}{l} \frac{34}{7} + 9 = \frac{97}{7} \leq 15 \\ 7 \times \frac{34}{7} + 5 \times 3 = 49 \leq 49 \end{array} \quad \left| \quad D \begin{pmatrix} 7 \\ 0 \end{pmatrix} \quad \begin{array}{l} 7 + 3 \times 0 \leq 15 \\ 7 \times 7 + 5 \times 0 \leq 49 \end{array} \right.$$

$$\textcircled{3} \quad I(x_I, y_I) : \begin{cases} x + 3y = 15 \\ 7x + 5y = 49 \end{cases} \quad \begin{array}{l} 7x + 21y = 105 \\ 7x + 5y = 49 \\ \hline 16y = 56 \quad y = \frac{7}{2} \end{array}$$
$$x = 15 - 3y = 15 - 21 \times \frac{1}{2} = \frac{9}{2}$$

$$I\left(\frac{9}{2}, \frac{7}{2}\right)$$

$$\textcircled{4} \quad \text{Solution du problème RP : } h(E) = \frac{9}{2} + 2 \times \frac{7}{2} = \frac{23}{2}$$

$U=0$

$$E \begin{cases} F_1 (y \leq 4) : h(F_1) = f(3, 4) = 3 + 2 \times 4 = 11 : \underline{U=11} \text{ et on élague} \end{cases}$$

$$E \begin{cases} F_2 (y \leq 3) : h(F_2) = f\left(\frac{34}{7}, 3\right) = \frac{34}{7} + 6 = \frac{76}{7} < U : \text{on élague} \end{cases}$$

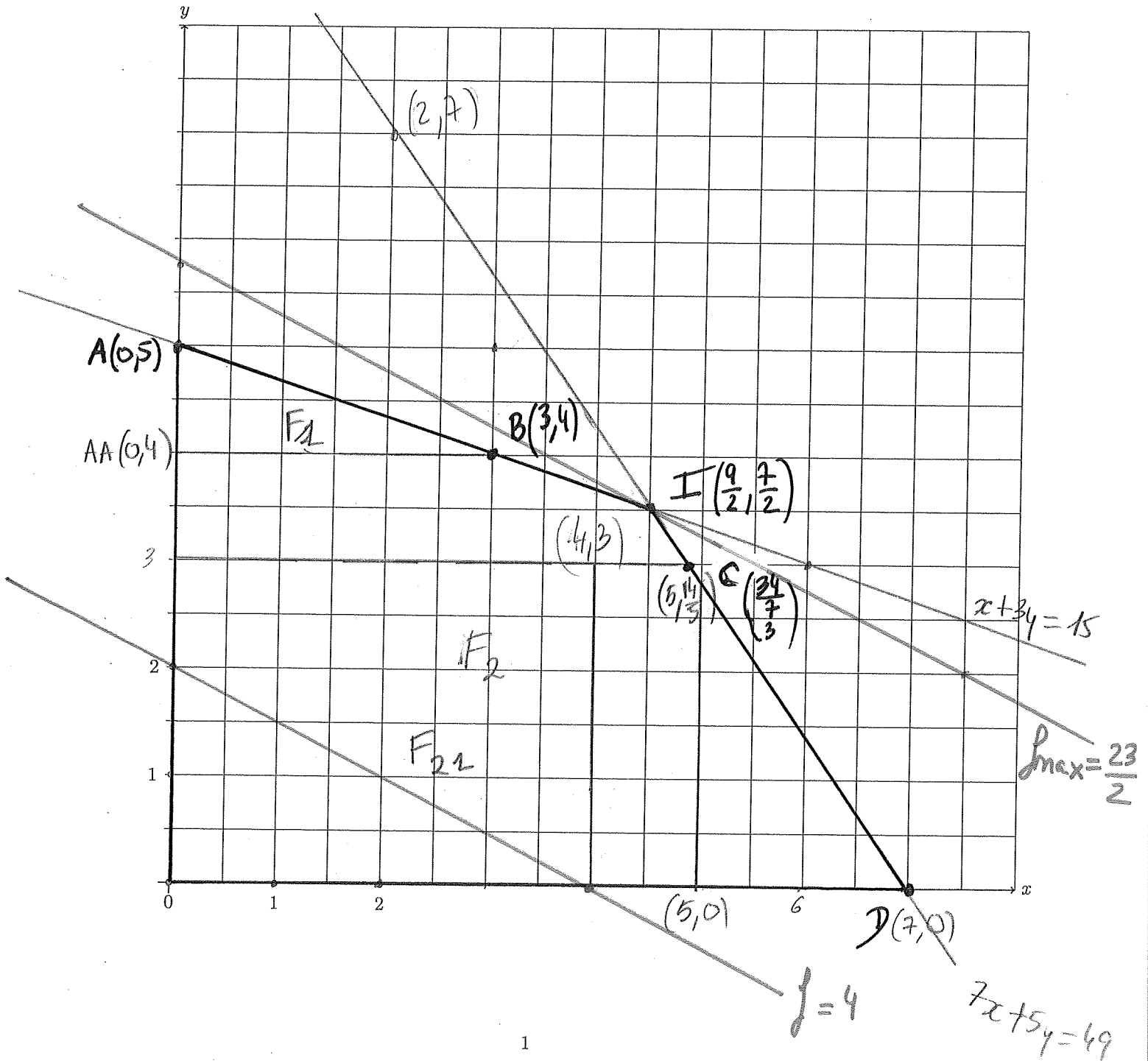
Solution du problème :

$$f_{\max} = 11 \text{ par } (x, y) = (3, 4)$$

NOM :

PRENOM :

Graphique de l'exercice 2



Exercice 3

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① P_2 $A(2, \frac{18}{10})$ correspond à la solution du problème RP.

$$h(E) = 2 + 5 \times \frac{18}{10} = 2 + 9 = 11$$

$$\cancel{U=0} \quad \cancel{U=7}$$

E — $F_1 = E \cap \{y \leq 1\} : h(F_1) = f(2, 1) = 2 + 5 = 7 > U : \underline{U=7}$ et on élague

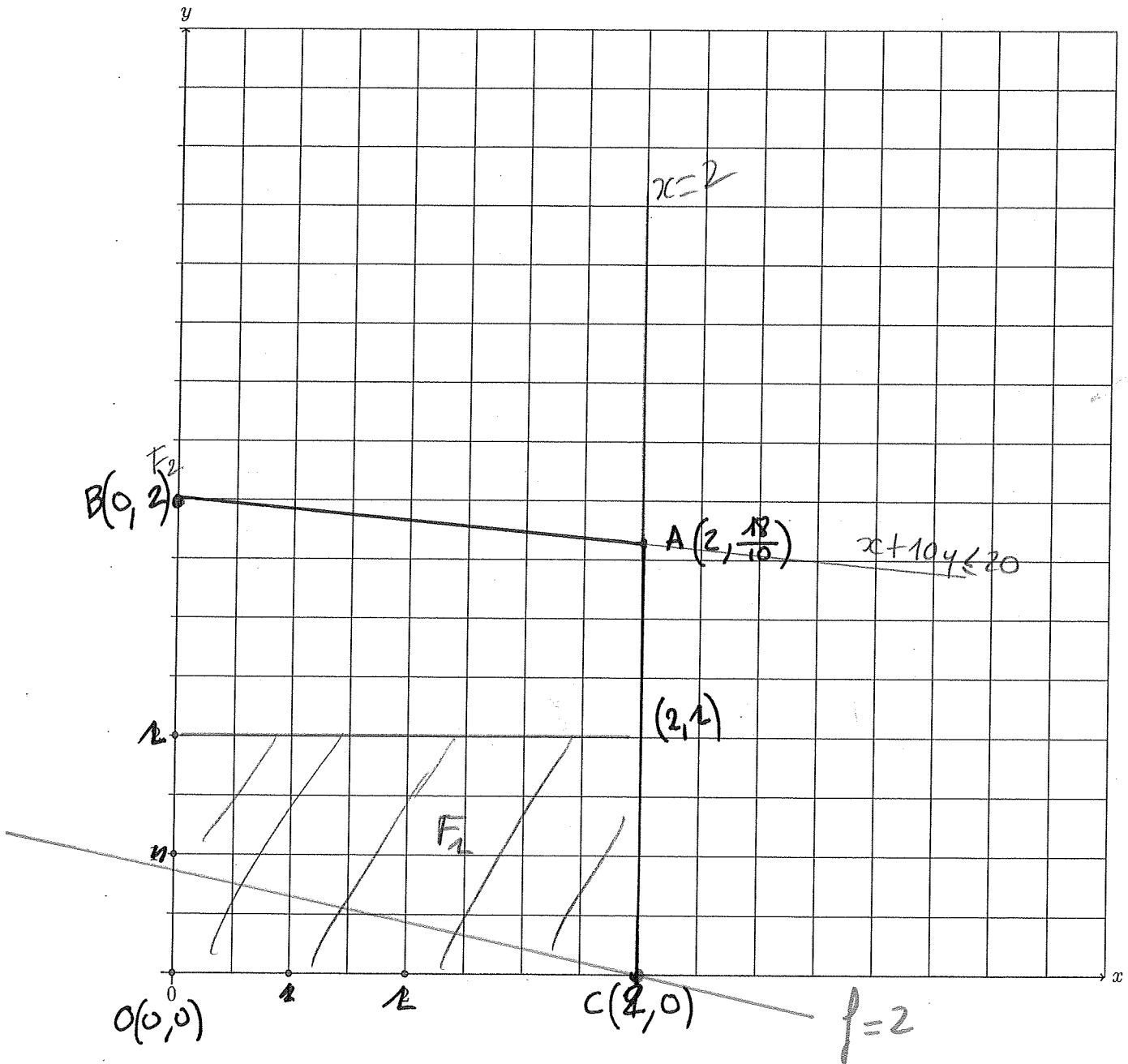
$F_2 = E \cap \{y \geq 2\} : h(F_2) = f(0, 2) = 0 + 5 \times 2 = 10 > U : \underline{U=10}$ et on élague

Solution de $P_1 : f_{\max} = 10$ par $(x, y) = (0, 2)$

NOM :

PRENOM :

Graphique de l'exercice 3, P₂



Exercice 3

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P_2 $\mathbb{E}\left(\frac{5}{2}, 0\right)$ correspondant à la solution du problème RP

$$h(E) = \frac{15}{2} + 0 = \frac{15}{2}$$

$U=0$

E — $F_1 = E \cap \{x \geq 3\} = \emptyset$: on élimine

E — $F_2 = E \cap \{x \leq 2\}$: $h(F_2) = 3 \times 2 + \frac{4}{3} = \frac{22}{3} > U$

F_2 — $F_{21} = F_2 \cap \{y \leq 1\}$: $h(F_{21}) = f(2, 1) = 7 > U$: on élimine et $U=7$

F_2 — $F_{22} = F_2 \cap \{y \geq 2\}$: $h(F_{22}) = 3 \times \frac{7}{4} + 2 = \frac{29}{4} > U$:

F_{22} — $F_{221} = F_{22} \cap \{x \geq 2\} = \emptyset$: on élimine

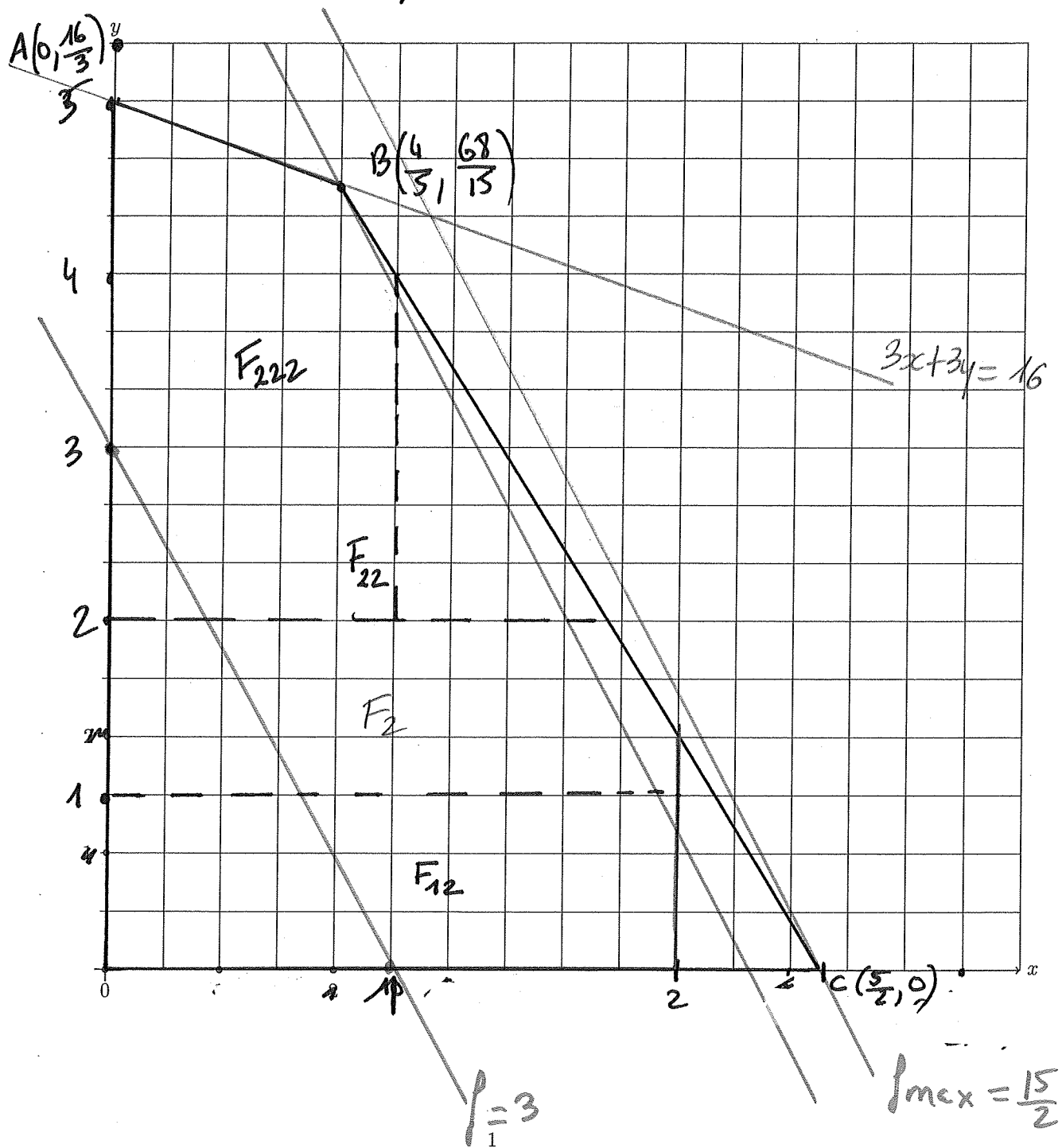
F_{22} — $F_{222} = F_{22} \cap \{x \leq 1\}$: $h(F_{222}) = f(1, 4) = 7 = U$: on élimine

Solution de P_2 :

$f_{\max} = 7$ par $(x=2, y=1)$ ou $(x=1, y=4)$

NOM :

PRENOM :

Graphique de l'exercice 3, P_2 

Exercice 3

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$$(P_3) \quad h(E) = 8 \times \frac{15}{4} + 5 \times \frac{9}{4} = 30 + \frac{45}{4} = \frac{165}{4} = 41,25$$

$$U = 0$$

$$E \begin{cases} F_1 = E \cap \{y \leq 2\} : h(F_1) = 8 \times \frac{35}{9} + 5 \times 2 = \frac{370}{9} > U \\ F_2 = E \cap \{y \geq 3\} \end{cases}$$

$$F_1 \begin{cases} F_{11} = F_1 \cap \{x \geq 4\} : h(F_{11}) = 8 \times 4 + 5 \times \frac{9}{5} = 41 > U \\ F_{12} = F_1 \cap \{x \leq 3\} \end{cases}$$

$$F_{11} \begin{cases} F_{111} = F_{11} \cap \{y \leq 1\} : h(F_{111}) = 8 \times \frac{40}{9} + 5 \times 1 = \frac{365}{9} > U \\ F_{112} = F_{11} \cap \{y \geq 2\} = \emptyset : \text{on élimine} \end{cases}$$

$$F_{111} \begin{cases} F_{1111} = F_{111} \cap \{x \leq 4\} = \{y \leq 1\} \cap \{x = 4\} : h(F_{1111}) = 8 \times 4 + 5 \times 1 = 37 < U : \text{on élimine} \\ F_{1112} \cap \{x \geq 5\} : h(F_{1112}) = f(5, 0) = 40 > U : \text{on élimine et } \underline{U = 40} \end{cases}$$

$$F_2 : h(F_2) = f(3, 2) = 8 \times 3 + 5 \times 2 = 34 < U : \text{on élimine}$$

Solution de P_3

$$f_{\max} = 40 \text{ par } (x, y) = (5, 0)$$

NOM :

PRENOM :

Graphique de l'exercice 3, P₃

