

Exercice de Révision : Automne n°10

Exercice 1 :

Soit $x \in \mathbb{R}$,

$$|x-5| + |3x+4| > 10$$

$$x-5 > 0$$

$$\Leftrightarrow x > 5 \quad \checkmark$$

$$4-3x > 0$$

$$\Leftrightarrow 4 > 3x$$

$$\Leftrightarrow \frac{4}{3} > x \quad \checkmark$$

$$\forall x < \frac{4}{3}$$

$$-x+5-3x+4 > 10 \quad \checkmark$$

$$\Leftrightarrow -4x+9-10 > 0 \quad \checkmark$$

$$\Leftrightarrow -4x-1 > 0 \quad \checkmark$$

$$\Leftrightarrow -4x > 1 \quad \checkmark$$

$$\text{On } -\frac{1}{4} < \frac{4}{3} \Leftrightarrow x < -\frac{1}{4} \quad \checkmark$$

$$y_1 =]-\infty; -\frac{1}{4}[$$

$$\forall x \in [\frac{4}{3}; 5]$$

$$-x+5+3x-4 > 10 \quad \checkmark$$

$$\Leftrightarrow 2x-9 > 0 \quad \checkmark$$

$$\Leftrightarrow x > \frac{9}{2} \quad \checkmark$$

$$\text{On } \frac{4}{3} < \frac{9}{2} < 5$$

$$y_2 =]\frac{9}{2}; 5]$$

$$\forall x > 5$$

$$x-5+3x-4 > 10 \quad \checkmark$$

$$\Leftrightarrow 4x-19 > 0$$

$$\Leftrightarrow x > \frac{19}{4} \quad \checkmark$$

$$\text{On } \frac{19}{4} < 5 \quad \text{oui}$$

$$\text{Donc, } y_3 = [5; +\infty[$$

Donc

$$S = y_1 \cup y_2 \cup y_3$$

$$S =]-\infty; -\frac{1}{4}[\cup]\frac{9}{2}; 5]$$

$$\cup [5; +\infty[$$

$$\Leftrightarrow S =]-\infty; -\frac{1}{4}[\cup]\frac{9}{2}; +\infty[$$

lien.

Exercice 2:

Soit $(x, y, z) \in \mathbb{R}^3$.

$$(S): \begin{cases} 2x + y + z = 3 \\ 3x - y - 2z = 0 \\ x + y - z = -2 \\ x + 2y + z = 1 \end{cases}$$

$$\Rightarrow \text{Dn} : \begin{cases} x + y - z = -2 \\ x + 2y + z = 1 \\ 2x + y + z = 3 \\ 3x - y - 2z = 0 \end{cases} \quad \begin{array}{l} L_3 \leftrightarrow L_1 \\ L_4 \leftrightarrow L_1 \end{array}$$

$$\Rightarrow \text{Dn} : \begin{cases} x + y - z = -2 \\ y + 2z = 3 \\ -y + 3z = 7 \\ -4y + z = 6 \end{cases} \quad \begin{array}{l} L_2 \leftarrow L_2 - L_1 \\ L_3 \leftarrow L_3 - 2L_1 \\ L_4 \leftarrow L_4 - 3L_1 \end{array}$$

$$\Rightarrow \text{Dn} : \begin{cases} x + y - z = -2 \\ y = 3 - 2z \\ 2z - 3 + 3z = 7 \\ -12 + 8z + z = 6 \end{cases}$$

Ce n'est pas du pivot de Gauss!!

$$\Rightarrow \text{Dn} : \begin{cases} x + y - z = -2 \\ y = 3 - 2z \\ 5z = 13 \\ 9z = 18 \end{cases}$$

$$\Rightarrow \text{Dn} : \begin{cases} x + y - z = -2 \\ y = -1 \\ z = 2 \\ z = 2 \end{cases}$$

$$\Rightarrow (S_1): \begin{cases} 2x = -2 + 2 + 1 \\ y = -1 \\ z = 2 \\ \underline{z = 2} \end{cases} \quad \checkmark$$

$$\Rightarrow (S_1): \begin{cases} x = 1 \\ y = -1 \\ z = 2 \\ \underline{(z = 2)} \end{cases}$$

Donc, $y = \{ (1; -1; 2) \}$ *oui*

Vérification:

Bien.

$$(S_1): \begin{cases} 2 \times 1 - 1 + 2 = 3 \\ 3 \times 1 + 1 - 4 = 0 \\ 1 - 1 + 2 = -2 \\ 1 - 2 + 2 = 1 \end{cases} \quad \Rightarrow \begin{cases} 3 = 3 \\ 0 = 0 \\ -2 = -2 \\ 1 = 1 \end{cases}$$

Les solutions vérifient bien le système.