LDDR Niveau 1 : TE 4 GEOMETRIE PLANE

EXERCICE 2

$\vec{a} = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$ $\vec{b} = \begin{pmatrix} 3 \\ -1 \end{pmatrix}$ $\vec{c} = \begin{pmatrix} -1 \\ 5 \end{pmatrix}$

1) $\begin{vmatrix} 1 & 3 \\ 2 & -1 \end{vmatrix} = -1 - 6 = -7 \neq 0 \Rightarrow \vec{a}, \vec{b}$ forment une base.

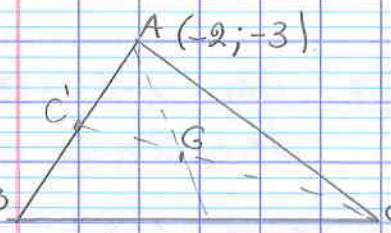
2) $\vec{c} = x\vec{a} + y\vec{b} \Rightarrow \begin{pmatrix} -1 \\ 5 \end{pmatrix} = x\begin{pmatrix} 1 \\ 2 \end{pmatrix} + y\begin{pmatrix} 3 \\ -1 \end{pmatrix} \Rightarrow$

$\Rightarrow \begin{cases} x + 3y = -1 \\ 2x - y = 5 \quad *3 \end{cases} \quad \begin{array}{l} x + 3y = -1 \\ +\ 6x - 3y = 15 \end{array}$

$7x = 14 \Rightarrow x = 2 \quad y = -1$

$\vec{c} = 2\vec{a} - \vec{b}$

EXERCICE 3



$G(1;2)$ $C'(2;0)$

- $x_{C'} = \frac{x_A + x_B}{2} \Rightarrow 2 = \frac{-2 + x_B}{2} \Rightarrow 4 = x_B - 2$

$\Rightarrow x_B = 6$

- $y_{C'} = \frac{y_A + y_B}{2} \Rightarrow 0 = \frac{-3 + y_B}{2} \Rightarrow y_B = 3$

$B(6;3)$

- $\vec{C'G} = \frac{1}{2}\vec{GC} \Rightarrow \vec{GC} = 2\vec{C'G} \Rightarrow \begin{pmatrix} x-1 \\ y-2 \end{pmatrix} = 2\begin{pmatrix} 1-2 \\ 2-0 \end{pmatrix} \Leftrightarrow$

$\Leftrightarrow \begin{cases} x - 1 = -2 \Rightarrow x = -1 \\ y - 2 = 4 \Rightarrow y = 6 \end{cases} \quad C(-1;6)$

EXERCICE 4

d : $A(-2;5)$ $B(6;11)$

1) $\vec{AB} = \begin{pmatrix} 8 \\ 6 \end{pmatrix}$ $d : \begin{cases} x = -2 + 8\lambda \\ y = 5 + 6\lambda \end{cases}$

2) $C(2,y) \in d \quad x = 2 \Rightarrow -2 + 8\lambda = 2 \Rightarrow 8\lambda = 4 \Rightarrow \lambda = 1/2$

$y = 5 + 6 \cdot \frac{1}{2} \Rightarrow y = 8$

3) $\vec{d} = \begin{pmatrix} 8 \\ 6 \end{pmatrix} \Rightarrow \vec{n} = \begin{pmatrix} 6 \\ -8 \end{pmatrix} // \begin{pmatrix} 3 \\ -4 \end{pmatrix}$

$d' // d \quad 3x - 4y + c = 0$

$N(-1;-2) \quad -3 + 8 + c = 0 \Rightarrow c = -5$

$3x - 4y - 5 = 0$

EXERCICE 5

1) a. $\begin{cases} x = 3+4\lambda \\ y = -4-\lambda \end{cases}$ b: $E(-5;-4)$ $F(3;-6)$

$\vec{EF} = \begin{pmatrix} 8 \\ -2 \end{pmatrix} // \begin{pmatrix} 4 \\ -1 \end{pmatrix} \Rightarrow \vec{n} = \begin{pmatrix} 1 \\ 4 \end{pmatrix}$

$x+4y+c=0$

b: $x+4y+21=0$ $F: 3-24+c=0 \Rightarrow c=21$

$3+4\lambda+4(-4-\lambda)+21=0 \Rightarrow 3+4\lambda-16-4\lambda+21=0$

$\Rightarrow 8=0$ impossible $\Rightarrow a // b$

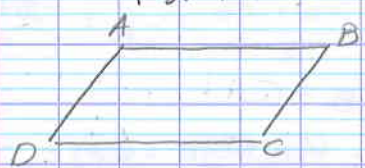
2) a: $2x-5y+2=0$ b: $\begin{cases} x = 2-\lambda \\ y = -1+4\lambda \end{cases}$

$2(2-\lambda)-5(-1+4\lambda)+2=0 \Leftrightarrow 4-2\lambda+5-20\lambda+2=0$

$\Rightarrow -22\lambda = -11 \Rightarrow \lambda = 1/2$ $\Rightarrow$ se coupent

$I\left(\frac{3}{2};1\right)$

EXERCICE 6



$D(3;7)$ $d_{AB}: x-6y+17=0$

$d_{BC}: 2x-y-10=0$

$B = d_{AB} \cap d_{BC} \begin{cases} x-6y+17=0 \quad *(-2) \\ 2x-y-10=0 \end{cases}$

$\begin{cases} -2x+12y-34=0 \\ 2x-y-10=0 \end{cases}$ $+$

$11y-44=0 \Rightarrow y=4 \Rightarrow x=7$ $B(7;4)$

On trouve la droite $d_{AD} // d_{BC}$:

$2x-y+c=0$ $D: 6-7+c=0 \Rightarrow c=1$

$d_{AD}: 2x-y+1=0$

$A = d_{AB} \cap d_{AD} = \begin{cases} x-6y+17=0 \quad *(-2) \\ 2x-y+1=0 \end{cases}$ $\begin{cases} -2x+12y-34=0 \\ 2x-y+1=0 \end{cases}$ $+$

$11y-33=0$

$\Rightarrow y=3$ $x=1$ $A(1;3)$

$\vec{AB} = \vec{DC} \Rightarrow \begin{pmatrix} 6 \\ 1 \end{pmatrix} = \begin{pmatrix} x-3 \\ y-7 \end{pmatrix} \Rightarrow x=9$ $y=8$ $C(9;8)$