

LDDR. Niveau 1: TE 2 GEOMETRIE PLANE

EXERCICE 1 $d: 2x - 5y + 1 = 0$ $A(4; -1)$

1) $A \notin d: 2 \cdot 4 + 5 + 1 = 14 \neq 0$

2)  $d \parallel d_1 \Rightarrow d_1: 2x - 5y + c = 0$
 $A: 8 + 5 + c = 0 \Rightarrow c = -13$
 $d_1: 2x - 5y - 13 = 0$

3) $d_2 \perp d$ $\vec{n}_d = \begin{pmatrix} 2 \\ -5 \end{pmatrix} \Rightarrow \vec{n}_2 = \begin{pmatrix} 5 \\ 2 \end{pmatrix}$
 $A \in d_2$ $5x + 2y + c = 0$ $A: 20 - 2 + c = 0 \Rightarrow$
 $d_2: 5x + 2y - 18 = 0$ $c = -18$

EXERCICE 2

$a: \begin{cases} x = -7 + 2\lambda \\ y = 3 - \lambda \end{cases}$ $b: 2x + 4y - 1 = 0$

$2(-7 + 2\lambda) + 4(3 - \lambda) - 1 = 0 \Leftrightarrow -14 + 4\lambda + 12 - 4\lambda - 1 = 0$
 $\Rightarrow -3 = 0$ impossible $\Rightarrow a \nparallel b$

EXERCICE 3 $d_1: A(-4; 4) B(2; 1)$ $d_2: x - 2y + 8 = 0$ $d_3: y = -\frac{3}{2}x \Rightarrow 2y = -3x \Rightarrow 3x + 2y = 0$

d1 $\vec{AB} = \begin{pmatrix} 6 \\ -3 \end{pmatrix} \parallel \begin{pmatrix} 2 \\ -1 \end{pmatrix} \Rightarrow \vec{n} = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$ $x + 2y + c = 0$
 $A: -4 + 8 + c = 0 \Rightarrow c = -4$

$\begin{cases} d_1: x + 2y - 4 = 0 \\ d_2: x - 2y + 8 = 0 \end{cases} (+) \quad \begin{matrix} 2x + 4 = 0 \Rightarrow x = -2 \\ y = 3 \end{matrix}$

$I = d_1 \cap d_2 (-2, 3)$ On va vérifier que la droite d_3 passe par I

$d_3: 3 \cdot (-2) + 2 \cdot 3 = 0 \Rightarrow I \in d_3 \Rightarrow$ les 3 droites passent par I

EXERCICE 4 $\vec{a} = \begin{pmatrix} 5 \\ 2 \end{pmatrix}$ $\vec{b} = \begin{pmatrix} 1 \\ 4 \end{pmatrix}$ $\vec{c} = \begin{pmatrix} 2 \\ 1 \end{pmatrix}$ $\vec{d} = \begin{pmatrix} m \\ -1 \end{pmatrix}$

a) $\vec{v} \perp \vec{a}$ $\vec{v} = \begin{pmatrix} 2 \\ -5 \end{pmatrix}$

b) $\vec{a} \cdot \vec{b} = 5+8=13$ $\vec{a} \cdot \vec{c} = 10+2k$
 $\vec{a} \cdot \vec{b} = \vec{a} \cdot \vec{c} \Rightarrow 13 = 10+2k \Rightarrow 2k=3 \Rightarrow k = \frac{3}{2}$
 $\vec{a} \cdot \vec{d} = 5m-2 = \vec{a} \cdot \vec{b} \Rightarrow 5m-2=13 \Rightarrow$
 $5m=15 \Rightarrow m=3$

EXERCISE 5

A(1;2) B(5;4) C(-2;8)



$$A' = \left(\frac{5-2}{2}, \frac{4+8}{2} \right) = \left(\frac{3}{2}, 6 \right)$$

$$\vec{AA'} = \begin{pmatrix} 1/2 \\ 4 \end{pmatrix} \parallel \begin{pmatrix} 1 \\ 8 \end{pmatrix} \Rightarrow \vec{n}_A = \begin{pmatrix} 8 \\ -1 \end{pmatrix}$$

$$8x - y + c = 0$$

$$A: 8 - 2 + c = 0 \Rightarrow c = -6$$

$$MA: 8x - y - 6 = 0$$

b) $\vec{AB} = \begin{pmatrix} 4 \\ 2 \end{pmatrix} \Rightarrow \vec{n}_h = \begin{pmatrix} 2 \\ -4 \end{pmatrix} \parallel \begin{pmatrix} 1 \\ -2 \end{pmatrix} \quad x - 2y + c = 0$

$$C: -2 - 16 + c = 0 \Rightarrow c = 18 \quad h: x - 2y + 18 = 0$$

c) $\vec{AB} = \begin{pmatrix} 4 \\ 2 \end{pmatrix} \Rightarrow \|\vec{AB}\| = \sqrt{16+4} = \sqrt{20}$
 $\vec{AC} = \begin{pmatrix} -3 \\ 6 \end{pmatrix} \Rightarrow \|\vec{AC}\| = \sqrt{9+36} = \sqrt{45}$
 $\vec{BC} = \begin{pmatrix} -7 \\ 4 \end{pmatrix} \Rightarrow \|\vec{BC}\| = \sqrt{49+16} = \sqrt{65}$
 $P = \sqrt{20} + \sqrt{45} + \sqrt{65}$

EXERCISE 6



A(-2;-1) B(10;5) $\vec{AC} \parallel \begin{pmatrix} 1 \\ 1 \end{pmatrix}$

$$\vec{n}_{AC} = \begin{pmatrix} 1 \\ -1 \end{pmatrix} : x - y + c = 0$$

$$A: -2 + 1 + c = 0 \Rightarrow c = 1$$

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

$$\vec{BC} \perp \vec{AB} = \begin{pmatrix} 1 \\ 6 \end{pmatrix} \parallel \begin{pmatrix} 2 \\ 1 \end{pmatrix} \Rightarrow d_{BC} = 2x + y + c = 0$$

$$B: 20 + 5 + c = 0 \Rightarrow c = -25; d_{BC} = 2x + y - 25 = 0$$

$$C = d_{AC} \cap d_{BC}: \begin{cases} x - y + 1 = 0 \\ 2x + y - 25 = 0 \end{cases} \quad (*) \quad 3x = 24 \Rightarrow x = 8$$

$$C(8;9)$$

$$\vec{AB} = \vec{DC} \Rightarrow \begin{pmatrix} 1 \\ 6 \end{pmatrix} = \begin{pmatrix} 8-x \\ 9-y \end{pmatrix} \Rightarrow \begin{matrix} x = -4 \\ y = 3 \end{matrix}$$

$$D(-4;3)$$