

Géométrie - droites

1) (d₁): $\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 2 \\ 5 \end{pmatrix} + k \cdot \begin{pmatrix} 3 \\ 4 \end{pmatrix}$ (d₂): $-5x - 2y + 4 = 0$

a) (d₁) : $\vec{d}_1 = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$ $\vec{n}_1 = \begin{pmatrix} -4 \\ 3 \end{pmatrix}$ $m_1 = \frac{4}{3}$ $A_1(2;5)$

(d₂) : $\vec{d}_2 = \begin{pmatrix} 2 \\ -5 \end{pmatrix}$ $\vec{n}_2 = \begin{pmatrix} -5 \\ -2 \end{pmatrix}$ $m_2 = -\frac{5}{2}$ $A_2(0;2)$

(si $x=0 \Rightarrow 0-2y+4=0$
 $y=2$)

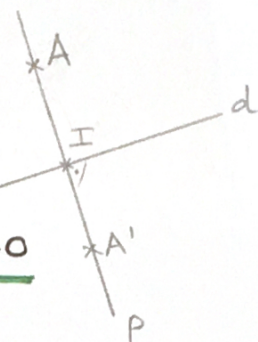
b) (d₁) et (d₂) sont séchantes car $m_1 \neq m_2$
et non perpendiculaires car $\vec{d}_1 \cdot \vec{d}_2 = 6 - 20 \neq 0$

2) d: $2x - y + 9 = 0$ $\vec{d} = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$

a) $\vec{n}_p = \vec{d} = \begin{pmatrix} 1 \\ 2 \end{pmatrix} \Rightarrow x + 2y + c = 0$

$A \in p : 5 + 8 + c = 0$
 $c = -13$

$\Rightarrow x + 2y - 13 = 0$



b) cherchons I intersection de d et p

$$\begin{cases} 2x - y = -9 \\ x + 2y = 13 \end{cases} \begin{matrix} | 2 \\ | 1 \end{matrix} \Leftrightarrow \begin{cases} 2x - y = -9 \\ 5x = -5 \end{cases} \Leftrightarrow \begin{cases} y = 2 \cdot (-1) + 9 = 7 \\ x = -1 \end{cases}$$

$\Rightarrow I(-1;7)$

A' symétrique de A par rapport à d : $\vec{AI} = \vec{IA'}$

$\Leftrightarrow \begin{pmatrix} -6 \\ 3 \end{pmatrix} = \begin{pmatrix} x+1 \\ y-7 \end{pmatrix}$

$\Leftrightarrow \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -7 \\ 10 \end{pmatrix} \Rightarrow \underline{A'(-7;10)}$

c) $\delta(A,d) = \|\vec{AI}\| = \left\| \begin{pmatrix} -6 \\ 3 \end{pmatrix} \right\| = \sqrt{36+9} = \sqrt{45} = \underline{3\sqrt{5} \approx 6,71}$

3) $\vec{n} = \begin{pmatrix} 2 \\ -5 \end{pmatrix} \Rightarrow 2x - 5y + c = 0$
 $P(-2;3) \in d : -4 - 15 + c = 0$
 $c = 19$ $\Rightarrow d : \underline{2x - 5y + 19 = 0}$

4) d: $5x + 2y - 21 = 0$

$A(x, -x) \in d : 5x - 2x - 21 = 0$
 $3x - 21 = 0$

$x = 7 \Rightarrow \underline{A(7;-7)}$

$$5) \quad M(1;3) \quad N(-2;5) \quad P(5;1)$$

$$A \text{ milieu de } MP \Leftrightarrow A(3;2)$$

$$\text{vect. direct. de } d : \vec{d} = \overrightarrow{MN} = \begin{pmatrix} -3 \\ 2 \end{pmatrix} \Rightarrow d: 2x+3y+c=0 \quad \left. \begin{array}{l} \\ A \in d: 6+6+c=0 \Rightarrow c=-12 \end{array} \right\}$$

$$\Rightarrow \underline{\underline{d: 2x+3y-12=0}}$$

$$6) \quad \underline{\underline{\vec{d} = \begin{pmatrix} 3 \\ -1 \end{pmatrix}}} \quad \underline{\underline{\vec{n} = \begin{pmatrix} 1 \\ 3 \end{pmatrix}}} \quad \underline{\underline{m = -\frac{1}{3}}}$$

$$d: x+3y+c=0$$

$$(4;0) \in d: 4+c=0 \Leftrightarrow c=-4$$

$$d: \underline{\underline{x+3y-4=0}}$$

$$\Leftrightarrow 3y = -x+4$$

$$\Leftrightarrow \underline{\underline{y = -\frac{1}{3}x + \frac{4}{3}}}$$