LDDR Niveau 1 : TE II Geometrie Plane

Exercice 1

$\vec{a}\begin{pmatrix}2\\-3\end{pmatrix}$ $\vec{b}\begin{pmatrix}5\\7\end{pmatrix}$ $\vec{c}\begin{pmatrix}-4\\3\end{pmatrix}$

1. $\vec{a}\cdot\vec{b} = 10-21 = -11$ $\quad \vec{b}\cdot\vec{c} = -20+21 = 1$
2. $\vec{d}\perp\vec{a} \Rightarrow \vec{d}\begin{pmatrix}3\\2\end{pmatrix}$
3. $\|\vec{c}\| = \sqrt{16+9} = 5 \Rightarrow \vec{u}\begin{pmatrix}-4/5\\3/5\end{pmatrix}$
4. $\cos\varphi = \dfrac{\vec{b}\cdot\vec{c}}{\|\vec{b}\|\cdot\|\vec{c}\|} = \dfrac{-20+21}{\sqrt{25+49}\cdot\sqrt{16+9}} = \dfrac{1}{\sqrt{74}\cdot 5} \Rightarrow \varphi = 88,67°$

Exercice 2

$d : 5x+2y-9=0$

1. $\vec{n}\begin{pmatrix}5\\2\end{pmatrix} \Rightarrow \vec{d}\begin{pmatrix}2\\-5\end{pmatrix}$ $\quad m = -\dfrac{5}{2}$
2. $d_1 \perp d$ $\quad A(-1;3)$ $\quad \vec{n}_1 = \vec{d}\begin{pmatrix}2\\-5\end{pmatrix}$ $\quad 2x-5y+c=0$
   $A : -2-15+c=0 \Rightarrow c=17$
   $d_1 : 2x-5y+17=0$
3. $\vec{d}_1\begin{pmatrix}5\\2\end{pmatrix}$ $\quad \vec{d}_2\begin{pmatrix}1\\4\end{pmatrix}$ $\quad \vec{d}_1\cdot\vec{d}_2 = 5+8 = 13$
   $\|\vec{d}_1\| = \sqrt{25+4} = \sqrt{29}$ $\quad \|\vec{d}_2\| = \sqrt{1+16} = \sqrt{17}$
   $\cos\varphi = \dfrac{\vec{d}_1\cdot\vec{d}_3}{\|\vec{d}_1\|\cdot\|\vec{d}_3\|} = \dfrac{13}{\sqrt{29}\cdot\sqrt{17}} \Rightarrow \varphi = 54,16°$

Exercice 3

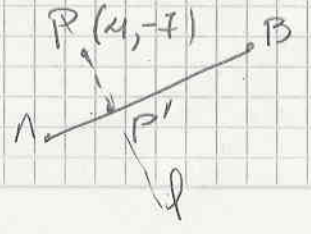
$d : 4x-3y-24=0$

- $A(11;-10)$ $\quad dist(A,d) = \dfrac{|44+30-24|}{\sqrt{16+9}} = \dfrac{50}{5} = 10$
- $B(9;4)$ $\quad dis(B,d) = \dfrac{|36-12-24|}{\sqrt{16+9}} = 0 \Rightarrow B \in d$

Exercice 4

$A(-3;4)$ $\quad B(9;-2)$

1. $\vec{AB}\begin{pmatrix}12\\-6\end{pmatrix} // \begin{pmatrix}2\\-1\end{pmatrix} \Rightarrow \vec{n}\begin{pmatrix}1\\2\end{pmatrix}$ $\quad x+2y+c=0$
   $A : -3+8+c=0 \Rightarrow c=-5$
   $d_{AB} : x+2y-5=0$



$l : \vec{n}_l\begin{pmatrix}2\\-1\end{pmatrix}$ $\quad 2x-y+c=0$ $\quad P : 8+7+c=0 \Rightarrow c=-15$
$l : 2x-y-15=0$

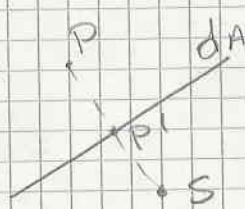
$P' = \beta \cap d_{AB}$ $\begin{cases} 2x - y = 15 \\ x + 2y = 5 \end{cases} \cdot 2$ $\begin{cases} 4x - 2y = 30 \\ x + 2y = 5 \end{cases}$

$5x = 35 \Rightarrow x = 7$

$y = -1$

$P'(7; -1)$

2.



$P(4; -7)$ $P'(7; -1)$

$\vec{PP'} = \vec{P'S} \Rightarrow \begin{pmatrix} 3 \\ 6 \end{pmatrix} = \begin{pmatrix} x - 7 \\ y + 1 \end{pmatrix} \Rightarrow \begin{matrix} x = 10 \\ y = 5 \end{matrix}$

$S(10; 5)$