

L1P: TE 1 GEOMETRIE PLANE

Exercice 1. $\vec{a} = \begin{pmatrix} 2 \\ 1 \end{pmatrix}$ $\vec{b} = \begin{pmatrix} -1 \\ 3 \end{pmatrix}$

1. $\vec{a} \cdot \vec{b} = -2 + 3 = 1$

2. $\|\vec{a}\| = \sqrt{2^2 + 1} = \sqrt{5}$ $\|\vec{b}\| = \sqrt{1 + 3^2} = \sqrt{10}$

3. $\cos \varphi = \frac{\vec{a} \cdot \vec{b}}{\|\vec{a}\| \cdot \|\vec{b}\|} = \frac{1}{\sqrt{5} \sqrt{10}} \Rightarrow \varphi = 81.87^\circ$

Exercice 2 $\vec{a} = \begin{pmatrix} 2 \\ 7 \end{pmatrix}$ $\vec{b} = \begin{pmatrix} x-1 \\ -1 \end{pmatrix}$

1) $\vec{a} \perp \vec{b} \Rightarrow \vec{a} \cdot \vec{b} = 0 \Rightarrow 2(x-1) + 7 \cdot (-1) = 0 \Rightarrow$
 $\Rightarrow 2x - 2 - 7 = 0 \Rightarrow x = \frac{9}{2}$

2) $\vec{a} \parallel \vec{b} \Rightarrow \begin{vmatrix} 2 & x-1 \\ 7 & -1 \end{vmatrix} = 0 \Rightarrow -2 - 7(x-1) = 0$
 $\Rightarrow -2 - 7x + 7 = 0 \Rightarrow 5 = 7x \Rightarrow x = \frac{5}{7}$

Exercice 3 a) $y = -\frac{5}{11}x - 9$ $m = -\frac{5}{11} \Rightarrow \vec{d} = \begin{pmatrix} -11 \\ 5 \end{pmatrix}$
 $\Rightarrow \vec{n} = \begin{pmatrix} 5 \\ 11 \end{pmatrix}$

$11y = -5x - 99 \Rightarrow 5x + 11y + 99 = 0$

eq. ltes $\frac{5x + 11y + 99}{\sqrt{5^2 + 11^2}} = 0 \Rightarrow \frac{5x + 11y + 99}{\sqrt{146}} = 0$

b) $-2x + y - 1 = 0$ $\vec{n} = \begin{pmatrix} -2 \\ 1 \end{pmatrix} \Rightarrow \vec{d} = \begin{pmatrix} 1 \\ 2 \end{pmatrix} \Rightarrow m = 2$

eq. ltes $\frac{-2x + y - 1}{\sqrt{5}} = 0$

c) $\begin{cases} x = 3 - 7\lambda \\ y = 2\lambda \end{cases}$ $\vec{d} = \begin{pmatrix} -7 \\ 2 \end{pmatrix} \Rightarrow m = -\frac{2}{7}$
 $\vec{n} = \begin{pmatrix} 2 \\ 7 \end{pmatrix}$

$2x + 7y + c = 0$ $(3; 2): 6 + 14 + c = 0 \Rightarrow$
 $c = -20$

Eq ltes: $\frac{2x + 7y - 20}{\sqrt{4 + 49}} = 0 \Rightarrow \frac{2x + 7y - 20}{\sqrt{53}} = 0$

Exercice 4

$$d: 8y - 9 + x = 0 \Rightarrow x + 8y - 9 = 0$$

$$P(2; -1)$$

$$\delta(d, P) = \frac{|2 - 8 - 9|}{\sqrt{1+64}} = \frac{|-15|}{\sqrt{65}} = \frac{15}{\sqrt{65}}$$

Exercice 15

$$d_1: y = 2x - 1 \quad d_2: 4x - 2y + 11 = 0 \quad d_3: y - x + 1 = 0$$

$$2x - y - 1 = 0 \quad 2x - y + \frac{11}{2} = 0$$

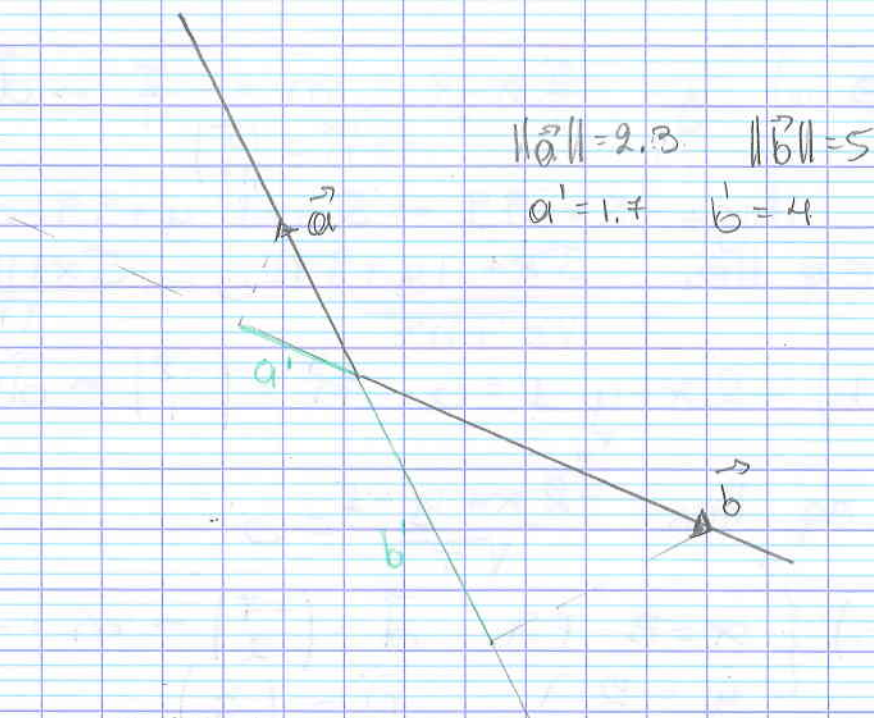
$$d_1 \parallel d_2$$

$$A \in d_1: x=0, y=-1$$

$$A(0; -1) \quad \delta(d_1, d_2) = \delta(A, d_2) =$$

$$= \frac{|2 + 11|}{\sqrt{4 + 2^2}} = \frac{13}{\sqrt{20}}$$

$$d_1 \nparallel d_3 \Rightarrow \delta(d_1, d_3) = 0$$



$$\|\vec{a}\| = 2.3 \quad \|\vec{b}\| = 5$$

$$a' = 1.7 \quad b' = 4$$

$$3. \quad \vec{a} \cdot \vec{b} = \|\vec{a}\| \cdot b' = 2.3 \cdot 4 = 8.8$$

$$\vec{b} \cdot \vec{a} = \|\vec{b}\| \cdot a' = 5 \cdot 1.7 = 8.5$$