

LDDR Niveau 1 : TE 1 GÉOMÉTRIE PLANE

Exercice 1.1 $\vec{a} = \begin{pmatrix} 6 \\ -4 \end{pmatrix}$ $\vec{b} = \begin{pmatrix} 10 \\ -15 \end{pmatrix}$ $\vec{c} = \begin{pmatrix} 17 \\ -8 \end{pmatrix}$

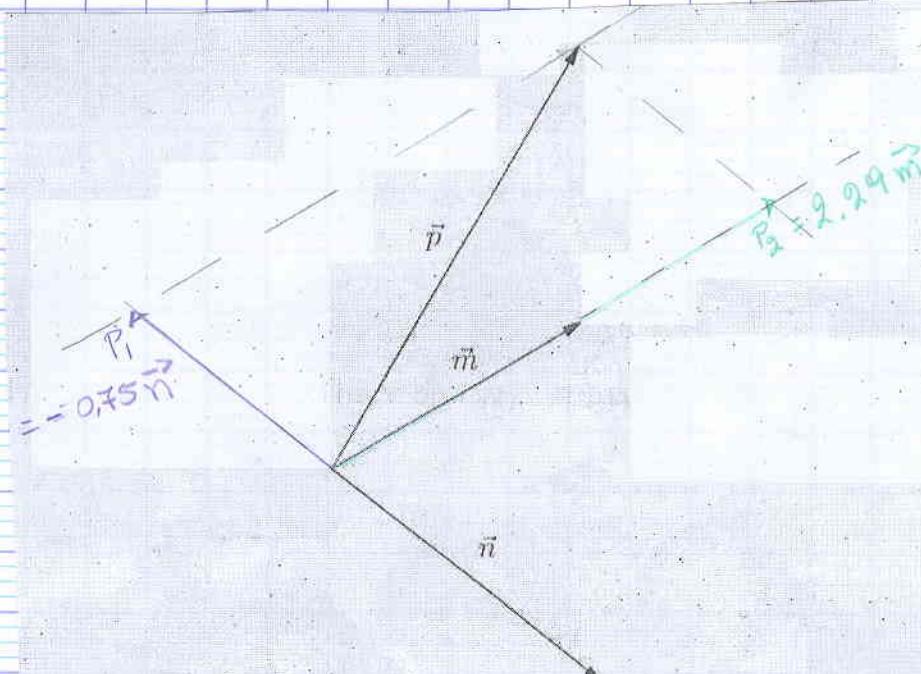
$$\vec{c} = x\vec{a} + y\vec{b} \Rightarrow \begin{pmatrix} 17 \\ -8 \end{pmatrix} = x\begin{pmatrix} 6 \\ -4 \end{pmatrix} + y\begin{pmatrix} 10 \\ -15 \end{pmatrix} \Rightarrow$$

$$\begin{cases} 17 = 6x + 10y & *2 \\ -8 = -4x - 15y & *3 \end{cases} \quad \begin{cases} 34 = 12x + 20y \\ -24 = -12x - 45y \end{cases} \quad + \quad 10 = -15y \Rightarrow y = -\frac{2}{3}$$

$$-8 = -4x + 10 \Rightarrow 4x = 18 \Rightarrow x = \frac{9}{2}$$

Donc $\vec{c} = \frac{9}{2}\vec{a} - \frac{2}{3}\vec{b} = \begin{pmatrix} 9/2 \\ -2/3 \end{pmatrix}$ dans (\vec{a}, \vec{b}) .

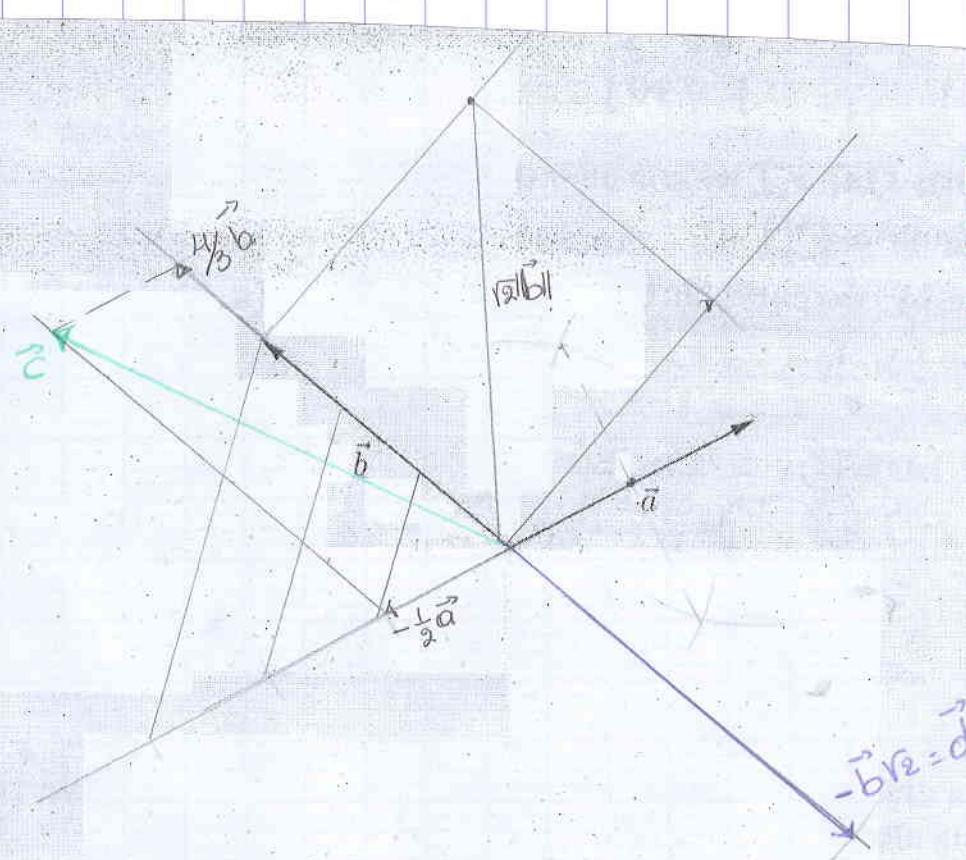
2)



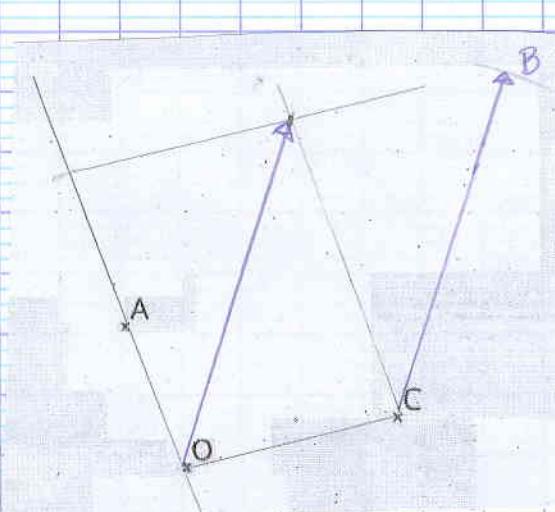
3)

- 2 -

3)



a)



EXERCICE 2

1) 
 $\vec{AB} = \vec{DC} \Rightarrow \begin{pmatrix} 7 \\ -15 \end{pmatrix} = \begin{pmatrix} x+2 \\ y+2 \end{pmatrix} \Rightarrow$
 $x+2 = 7 \Rightarrow x = 5$
 $y+2 = -15 \Rightarrow y = -17$

2) M milieu de AC. $M \left(\frac{3+5}{2}; \frac{7-17}{2} \right) \Rightarrow M(4; -5)$

3) $x_D = \frac{x_A + x_B + x_E}{3} \Rightarrow -2 = \frac{3 + 10 + x_E}{3} \Rightarrow -6 = x_E + 13 \Rightarrow x_E = -19$
 $y_D = \frac{y_A + y_B + y_E}{3} \Rightarrow 4 = \frac{7 - 8 + y_E}{3} \Rightarrow 12 = -1 + y_E \Rightarrow y_E = 13$
 $E(-19; 13)$

EXERCICE 3 1) $\vec{a} = \begin{pmatrix} k \\ 3 \end{pmatrix}$ $\vec{b} = \begin{pmatrix} 2k+1 \\ 6+k \end{pmatrix}$ $\begin{vmatrix} k & 2k+1 \\ 3 & 6+k \end{vmatrix} = k(6+k) - 3(2k+1)$
 $= 6k + k^2 - 6k - 3 = k^2 - 3 = 0 \Rightarrow k \neq \pm \sqrt{3}$

Donc \vec{a}, \vec{b} lin indépendants si $k \neq \pm \sqrt{3}$

2) $\vec{BA} = \begin{pmatrix} -8 \\ 4 \end{pmatrix} \Rightarrow \begin{cases} x_A - x_B = -8 \\ y_A - y_B = 4 \end{cases} \Rightarrow \begin{cases} x_A - x_B = -8 \\ y_A - y_B = 4 \end{cases}$

$M(45; -54)$ $45 = \frac{x_A + x_B}{2} \Rightarrow x_A + x_B = 90$
 $-54 = \frac{y_A + y_B}{2} \Rightarrow y_A + y_B = -108$

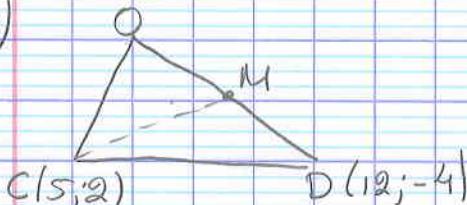
$$\begin{cases} x_A - x_B = -8 & (1) \\ x_A + x_B = 90 & (2) \end{cases} \Rightarrow 2x_A = 82 \Rightarrow x_A = 41$$

$$\begin{cases} y_A - y_B = 4 & (1) \\ y_A + y_B = -108 & (2) \end{cases} \Rightarrow 2y_A = -104 \Rightarrow y_A = -52$$

$$-52 + y_B = -108 \Rightarrow y_B = -56.$$

A(41; -52) B(49; -56)

3)



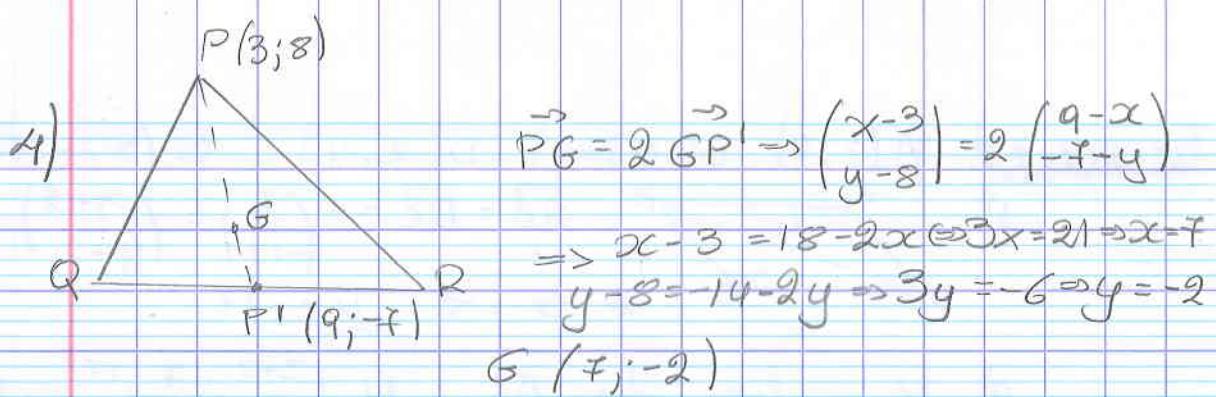
$M \left(\frac{12}{2}; -\frac{4}{2} \right) = (6; -2)$
 $\vec{CM} = \begin{pmatrix} 1 \\ -4 \end{pmatrix} \Rightarrow \vec{n} = \begin{pmatrix} 4 \\ 1 \end{pmatrix}$

$m_C: 4x + y + c = 0$

C: $20 + 2 + c = 0 \Rightarrow c = -22$

$m_C: 4x + y - 22 = 0$

-4-



Exercise 4

$$1) y = 2x - 5 \quad \text{point } x=0 \quad y=-5 \quad (0, -5)$$

$$\text{eq. count: } 2x - y - 5 = 0 \quad \vec{n} = \begin{pmatrix} 2 \\ -1 \end{pmatrix} \quad \vec{d} = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$$

$$\text{eq. par: } \begin{cases} x = 2 \\ y = -5 + 2x \end{cases}$$

$$2) 4x - 5y + 22 = 0 \quad \vec{n} = \begin{pmatrix} 4 \\ -5 \end{pmatrix} \Rightarrow \vec{d} = \begin{pmatrix} 5 \\ 4 \end{pmatrix}$$

$$\text{point: } x=-3 \quad -12 - 5y + 22 = 0 \Rightarrow 5y = 10 \Rightarrow y=2$$

$$A(-3; 2) \quad \begin{cases} x = -3 + 5\lambda \\ y = 2 + 4\lambda \end{cases}$$

$$3) \begin{cases} x = 2 + \lambda \\ y = -5 + 3\lambda \end{cases} \quad \vec{d} = \begin{pmatrix} 1 \\ 3 \end{pmatrix} \quad \vec{n} = \begin{pmatrix} 3 \\ -1 \end{pmatrix}$$

$$\text{point: } x = -7 = 2 + \lambda \Rightarrow \lambda = -9$$

$$y = -5 - 27 = -32 \quad (-7; -32)$$

$$\vec{d} = \begin{pmatrix} 1 \\ 3 \end{pmatrix} \parallel \begin{pmatrix} -5 \\ 15 \end{pmatrix}$$