

LDDR Niveau 1: TE 1 GEOMETRIE PLANE

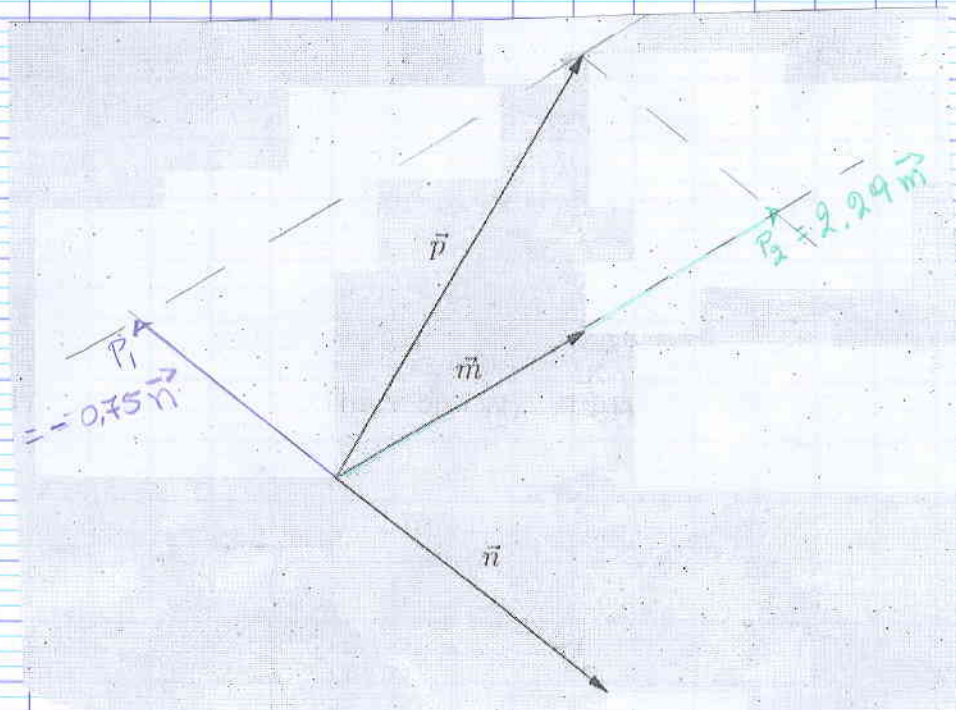
Exercice 1.1) $\vec{a} = \begin{pmatrix} 6 \\ -4 \end{pmatrix}$ $\vec{b} = \begin{pmatrix} 10 \\ -15 \end{pmatrix}$ $\vec{c} = \begin{pmatrix} 17 \\ -8 \end{pmatrix}$

$$\vec{c} = x\vec{a} + y\vec{b} \Rightarrow \begin{pmatrix} 17 \\ -8 \end{pmatrix} = x \begin{pmatrix} 6 \\ -4 \end{pmatrix} + y \begin{pmatrix} 10 \\ -15 \end{pmatrix} \Rightarrow$$
$$\Rightarrow \begin{cases} 17 = 6x + 10y & \times 2 \\ -8 = -4x - 15y & \times 3 \end{cases} \Rightarrow \begin{cases} 34 = 12x + 20y \\ -24 = -12x - 45y \end{cases} +$$
$$10 = -15y \Rightarrow y = -\frac{2}{3}$$

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

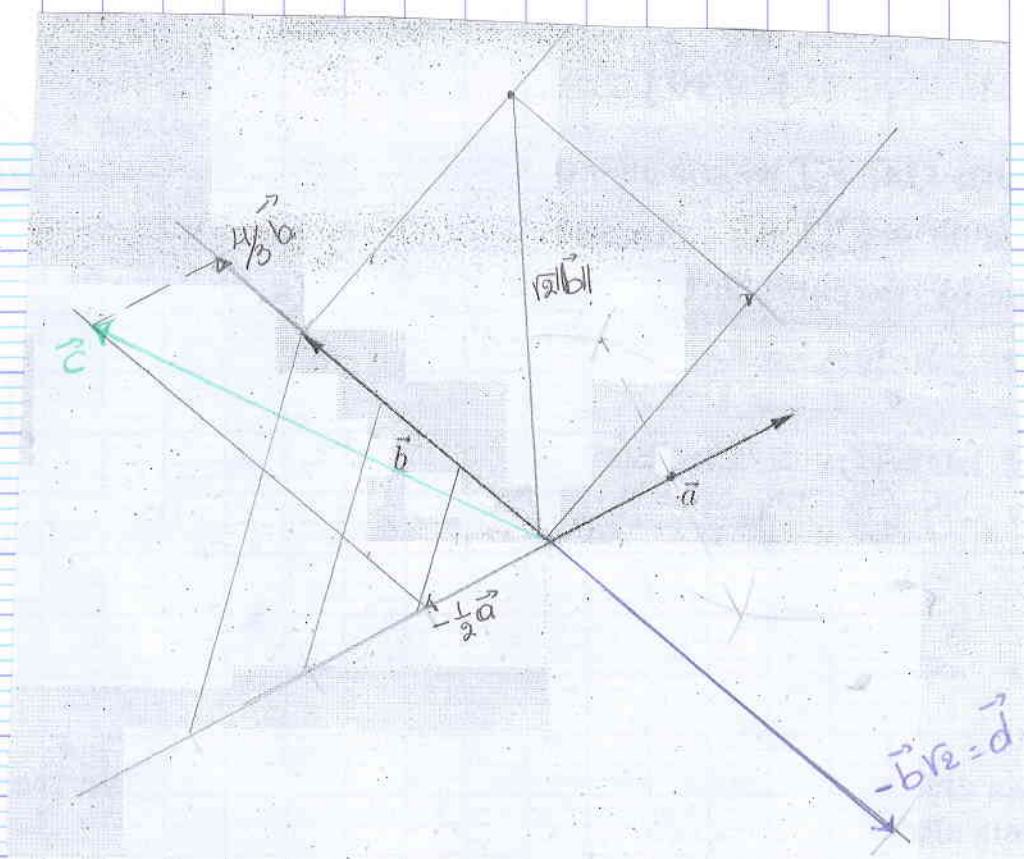
Donc $\vec{c} = \frac{9}{2}\vec{a} - \frac{2}{3}\vec{b} = \begin{pmatrix} 9/2 \\ -2/3 \end{pmatrix}$ dans (\vec{a}, \vec{b}) .

2)

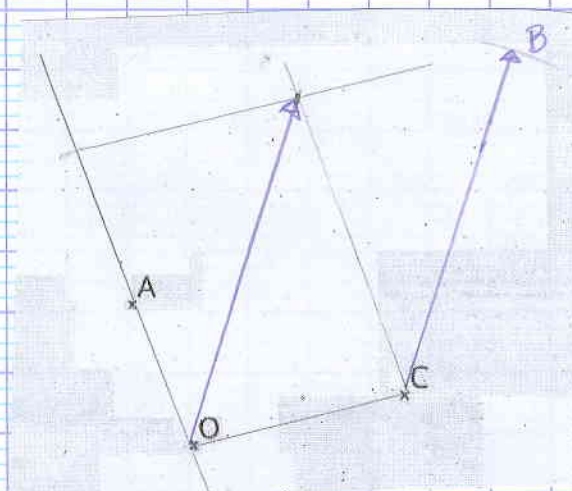


3)


3)



4)



EXERCICE 2 A(3;7) B(10;-8) D(-2;4) C(5;-17)

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

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

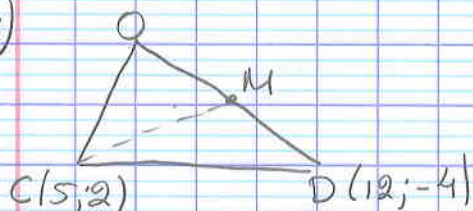
Donc \vec{a}, \vec{b} lin indépendants si $k \neq \pm\sqrt{3}$

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

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

$\begin{cases} x_A - x_B = -8 & (+) \Rightarrow 2x_A = 82 \Rightarrow x_A = 41 \\ x_A + x_B = 90 & \Rightarrow 41 + x_B = 90 \Rightarrow x_B = 49 \end{cases}$
 $\begin{cases} y_A - y_B = 4 & (+) \Rightarrow 2y_A = -104 \Rightarrow y_A = -52 \\ y_A + y_B = -108 & \Rightarrow -52 + y_B = -108 \Rightarrow y_B = -56 \end{cases}$
A(41; -52) B(49; -56)

3)



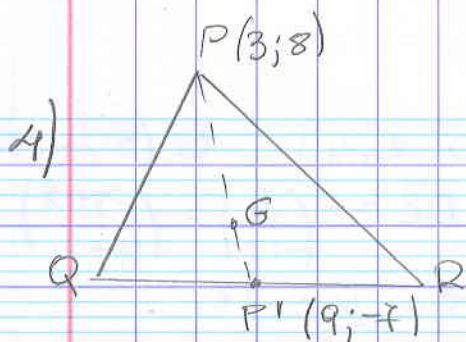
$M\left(\frac{12}{2}; -\frac{4}{2}\right) = (6; -2)$
 $\vec{CM} = \begin{pmatrix} 1 \\ -4 \end{pmatrix} \Rightarrow \vec{n} = \begin{pmatrix} 4 \\ 1 \end{pmatrix}$

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

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

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

-4-



$$\vec{PG} = 2\vec{GP'} \Rightarrow \begin{pmatrix} x-3 \\ y-8 \end{pmatrix} = 2 \begin{pmatrix} 9-x \\ -7-y \end{pmatrix}$$

$$\Rightarrow x-3 = 18-2x \Rightarrow 3x = 21 \Rightarrow x = 7$$

$$y-8 = -14-2y \Rightarrow 3y = -6 \Rightarrow y = -2$$

$$G(7;-2)$$

Exercise 4

1) $y = 2x - 5$ point: $x=0$ $y=-5$ $(0, -5)$
 eq. cond: $2x - y - 5 = 0$ $\vec{n} = \begin{pmatrix} 2 \\ -1 \end{pmatrix}$ $\vec{d} = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$
 eq. par: $\begin{cases} x = \lambda \\ y = -5 + 2\lambda \end{cases}$

2) $4x - 5y + 22 = 0$ $\vec{n} = \begin{pmatrix} 4 \\ -5 \end{pmatrix} \Rightarrow \vec{d} = \begin{pmatrix} 5 \\ 4 \end{pmatrix}$
 point: $x = -3$ $-12 - 5y + 22 = 0 \Rightarrow 5y = 10 \Rightarrow y = 2$
 $A(-3; 2)$ $\begin{cases} x = -3 + 5\lambda \\ y = 2 + 4\lambda \end{cases}$

3) $\begin{cases} x = 2 + \lambda \\ y = -5 + 3\lambda \end{cases}$ $\vec{d} = \begin{pmatrix} 1 \\ 3 \end{pmatrix}$ $\vec{n} = \begin{pmatrix} 3 \\ -1 \end{pmatrix}$
 point: $x = -7 = 2 + \lambda \Rightarrow \lambda = -9$
 $y = -5 - 27 = -32$ $(-7, -32)$

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