

Ex 1

$$a) \vec{AB} = \vec{OB} - \vec{OA} = \begin{pmatrix} -1 - 3 \\ 4 + 2 \end{pmatrix} = \begin{pmatrix} -4 \\ 6 \end{pmatrix}$$

$$\Rightarrow (AB): \begin{cases} x = 3 - 4k \\ y = -2 + 6k \end{cases}, k \in \mathbb{R}$$

$$b) \begin{cases} x = 3 - 4k & | & 3 \\ y = -2 + 6k & | & 2 \end{cases} \quad \begin{array}{l} 3x = 9 - 12k \\ + \\ 2y = -4 + 12k \end{array}$$

$$(AB): 3x + 2y = 5 \Leftrightarrow \underline{3x + 2y - 5 = 0}$$

Variante : (AB):  $6x + 4y + C = 0$

$$A \in (AB) \Rightarrow 6 \cdot 3 + 4 \cdot (-2) + C = 0$$

$$C = -10$$

$$\left. \begin{array}{l} \Rightarrow 6x + 4y - 10 = 0 \\ \Leftrightarrow 3x + 2y - 5 = 0 \end{array} \right\}$$

$$c) \underline{\vec{n}} = \begin{pmatrix} 3 \\ 2 \end{pmatrix} \text{ ou } \begin{pmatrix} 6 \\ 4 \end{pmatrix}$$

Ex 2

$$a) e: 6x - 8y + c = 0$$

$$P \in e \Rightarrow 6 \cdot (-3) - 8 \cdot 4 + c = 0$$

$$c = 50$$

$$\left. \begin{array}{l} \Rightarrow e: 6x - 8y + 50 = 0 \\ \Leftrightarrow \underline{3x - 4y + 25 = 0} \end{array} \right\}$$

$$b) \delta(P; d) = \frac{|6 \cdot (-3) - 8 \cdot 4 + 15|}{\sqrt{36 + 64}} = \frac{|-35|}{\sqrt{100}} = \frac{35}{10} = \underline{\frac{7}{2}} \text{ u}$$

$$c) f: 4x + 3y + c = 0$$

$$P \in f: 4 \cdot (-3) + 3 \cdot 4 + c = 0$$

$$c = 0$$

$$\left. \begin{array}{l} \Rightarrow f: \underline{4x + 3y = 0} \end{array} \right\}$$

Ex 3

$$\begin{aligned}
 \text{a) } \vec{AB} &= \begin{pmatrix} -2+5 \\ -6-3 \end{pmatrix} = \begin{pmatrix} 3 \\ -9 \end{pmatrix} = 3 \underbrace{\begin{pmatrix} 1 \\ -3 \end{pmatrix}}_{=\vec{n}} \Rightarrow m_{AB} : x-3y+c=0 \\
 M_{AB} \left( \frac{-5-2}{2}; \frac{3-6}{2} \right) &= M_{AB} \left( -\frac{7}{2}; -\frac{3}{2} \right) \in m_{AB} \\
 \Rightarrow -\frac{7}{2} - 3 \cdot \left( -\frac{3}{2} \right) + c &= 0 \\
 c &= -1
 \end{aligned}
 \left. \vphantom{\begin{aligned} \vec{AB} \\ M_{AB} \end{aligned}} \right\} \Rightarrow \underline{m_{AB} : x-3y-1=0}$$

b) centre du cercle circonscrit = intersection des médiatrices.

$$\begin{aligned}
 \vec{BC} &= \begin{pmatrix} 2+2 \\ 2+6 \end{pmatrix} = \begin{pmatrix} 4 \\ 8 \end{pmatrix} = 4 \underbrace{\begin{pmatrix} 1 \\ 2 \end{pmatrix}}_{=\vec{n}} \Rightarrow m_{BC} : x+2y+c=0 \\
 M_{BC} \left( \frac{-2+2}{2}; \frac{-6+2}{2} \right) &= M_{BC} (0; -2) \in m_{BC} \\
 \Rightarrow 0 + 2 \cdot (-2) + c &= 0 \\
 c &= 4
 \end{aligned}
 \left. \vphantom{\begin{aligned} \vec{BC} \\ M_{BC} \end{aligned}} \right\} \Rightarrow \underline{m_{BC} : x+2y+4=0}$$

$$\begin{aligned}
 \{K\} = m_{AB} \cap m_{BC} : \begin{cases} x-3y=1 & | & 1 \\ x+2y=-4 & | & -1 \end{cases} \Rightarrow \begin{array}{r} x-3y=1 \\ -x-2y=4 \\ \hline -5y=5 \\ y=-1 \end{array} \Rightarrow \begin{array}{l} x-3(-1)=1 \\ x+3=1 \\ x=-2 \end{array} \\
 \Rightarrow \underline{K(-2; -1)}
 \end{aligned}$$

$$r = \|\vec{KA}\|, \quad \vec{KA} = \begin{pmatrix} -5+2 \\ 3+1 \end{pmatrix} = \begin{pmatrix} -3 \\ 4 \end{pmatrix} \Rightarrow r = \sqrt{9+16} = \sqrt{25} = \underline{5 \text{ u}}$$

$$\begin{aligned}
 \text{c) } \vec{AB} &= \begin{pmatrix} 3 \\ -9 \end{pmatrix} = 3 \underbrace{\begin{pmatrix} 1 \\ -3 \end{pmatrix}}_{=\vec{n}} \Rightarrow h_c : x-3y+c=0 \\
 C \in h_c : 2-6+c &= 0 \Leftrightarrow c=4 \\
 \Rightarrow \underline{h_c : x-3y+4=0}
 \end{aligned}$$

Ex 4

$$b_{1,2} : \frac{2x-5y+1}{\underbrace{\sqrt{4+25}}_{\sqrt{29}}} = \pm \frac{5x-2y-3}{\underbrace{\sqrt{25+4}}_{\sqrt{29}}} \quad | \cdot \sqrt{29}$$

$$\Leftrightarrow 2x-5y+1 = \pm (5x-2y-3)$$

$$+ : 2x-5y+1 = 5x-2y-3$$

$$\underline{b_1 : -3x-3y+4 = 0}$$

$$- : 2x-5y+1 = -5x+2y+3$$

$$\underline{b_2 : 7x-7y-2 = 0}$$

$$b) \quad \underline{m_{b_1} = -\frac{-3}{-3} = -1} \quad \text{et} \quad \underline{m_{b_2} = -\frac{7}{-7} = 1}$$