

LDDR Niveau 1: TE 9 GEOMETRIE PLANE

EXERCICE 1

AB diamètre
A(-5, 4) B(11; -26)



$$K\left(-\frac{5+11}{2}; \frac{4-26}{2}\right) = (3; -11)$$

$$r = \frac{\|\vec{AB}\|}{2}$$

$$\vec{AB} = \begin{pmatrix} 16 \\ -30 \end{pmatrix}$$

$$r = \sqrt{16^2 + 30^2} = 34$$

$$(x-3)^2 + (y+11)^2 = 34^2$$

EXERCICE 2

$$C: (x-2)^2 + (y+1)^2 = 5 \quad d: y+3=0$$

$$C \cap d: (x-2)^2 + (-3+1)^2 = 5 \Leftrightarrow (x-2)^2 + 4 = 5 \Leftrightarrow$$

$$(x-2)^2 = 1 \Rightarrow x-2 = 1 \Rightarrow x_1 = 3 \quad A(3; -3)$$

$$x-2 = -1 \Rightarrow x_2 = 1 \quad B(1; -3)$$

EXERCICE 3

$$\vec{a} = \begin{pmatrix} -2 \\ 5 \end{pmatrix}$$

$$\vec{b} = \begin{pmatrix} 4 \\ -1 \end{pmatrix}$$

$$\cos \alpha = \frac{\vec{a} \cdot \vec{b}}{\|\vec{a}\| \cdot \|\vec{b}\|} = \frac{-13}{\sqrt{29} \cdot \sqrt{17}} \Rightarrow \alpha = 125,84^\circ$$

$$\vec{a} \cdot \vec{b} = -8 - 5 = -13$$

$$\|\vec{a}\| = \sqrt{4+25} = \sqrt{29}$$

$$\|\vec{b}\| = \sqrt{16+1} = \sqrt{17}$$

EXERCICE 4

$$d: 3x - 4y + 100 = 0$$

$$C: x^2 + 2x + y^2 - 8y - 139,25 = 0$$

$$\vec{n}_d = \begin{pmatrix} 3 \\ -4 \end{pmatrix} \Rightarrow \vec{n}' = \begin{pmatrix} 4 \\ 3 \end{pmatrix}$$

$$(x+1)^2 - 1 + (y-4)^2 - 16 - 139,25 = 0$$

$$\Leftrightarrow (x+1)^2 + (y-4)^2 = 156,25$$

$$d' = 4x + 3y + C = 0$$

$$K(-1; 4) \quad r = 12,5$$

$$\text{dist}(K, d') = r \Rightarrow$$

$$\frac{|-4 + 12 + C|}{\sqrt{16+9}} = 12,5 \Rightarrow$$

$$|C+8| = 62,5 \Rightarrow \begin{cases} C+8 = 62,5 \\ C+8 = -62,5 \end{cases}$$

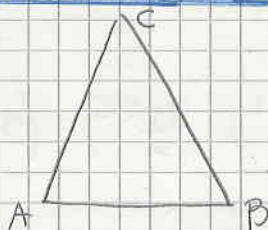
$$\Rightarrow C_1 = 54,5$$

$$C_2 = -70,5$$

$$d'_1: 4x + 3y + 54,5 = 0$$

$$d'_2: 4x + 3y - 70,5 = 0$$

EXERCICE 5



$$A(-13; -11) \quad B = (-6; 13)$$

Soit $C(x, y)$

$$\vec{CA} = \begin{pmatrix} -13-x \\ -1-y \end{pmatrix} \quad \vec{CB} = \begin{pmatrix} -6-x \\ 13-y \end{pmatrix}$$

$$\bullet \quad \|\vec{CA}\| = \|\vec{CB}\| \Rightarrow \sqrt{(13+x)^2 + (1+y)^2} = \sqrt{(6+x)^2 + (13-y)^2} \Leftrightarrow$$

$$\Leftrightarrow 169 + 26x + x^2 + 1 + 2y + y^2 = 36 + 12x + x^2 + 169 - 26y + y^2 \Leftrightarrow$$

$$\Leftrightarrow 14x + 28y - 35 = 0 \Leftrightarrow 2x + 4y - 5 = 0$$

$$\bullet \quad \begin{vmatrix} -13-x & -6-x \\ 1-y & 13-y \end{vmatrix} = -169 - 13x + 13y + xy + 6 - 6y + x - xy = -12x + 7y - 163$$

$$\text{Aire} = \frac{|-12x + 7y - 163|}{2} = 125 \Leftrightarrow |-12x + 7y - 163| = 250$$

$$\Rightarrow \begin{cases} -12x + 7y - 163 = 250 \\ -12x + 7y - 163 = -250 \end{cases} \Rightarrow \begin{cases} -12x + 7y = 413 \\ -12x + 7y = -87 \end{cases}$$

• On résout le système $\begin{cases} 2x + 4y = 5 \\ -12x + 7y = 413 \end{cases}$

$$\begin{cases} 12x + 24y = 30 \\ -12x + 7y = 413 \end{cases} \quad 2x + \frac{1772}{31} = 5 \Rightarrow 2x = \frac{-1617}{31} \Rightarrow x = \frac{-1617}{62}$$

$$31y = 443 \Rightarrow y = \frac{443}{31} \quad C_1 \left(\frac{-1617}{62}, \frac{443}{31} \right)$$

$$\begin{cases} 2x + 4y = 5 \\ -12x + 7y = -87 \end{cases} \quad \begin{cases} -12x + 24y = 30 \\ -12x + 7y = -87 \end{cases}$$

$$2x - \frac{228}{31} = 5 \Rightarrow 2x = \frac{383}{31} \Rightarrow x = \frac{383}{62}$$

$$31y = -57 \Rightarrow y = \frac{-57}{31}$$

$$C_2 \left(\frac{383}{62}, \frac{-57}{31} \right)$$