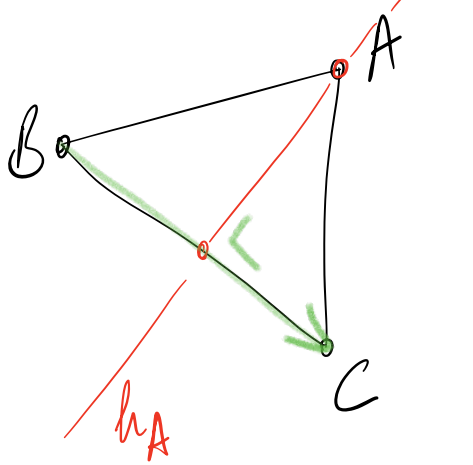
Soit ABC le triangle donné par ses sommets:

$A(4;5)$ $B(-2;6)$ $C(3;-5)$

Donner les équations des **hauteurs** de ce triangle.



$\vec{BC} = \begin{pmatrix} 5 \\ -11 \end{pmatrix}$ $\vec{BC} \perp h_A$

$h_A: 5x - 11y + k = 0$

$A \in h_A$ (h_A passe par A)

$A(4;5): \; 5 \cdot 4 - 11 \cdot 5 + k = 0$

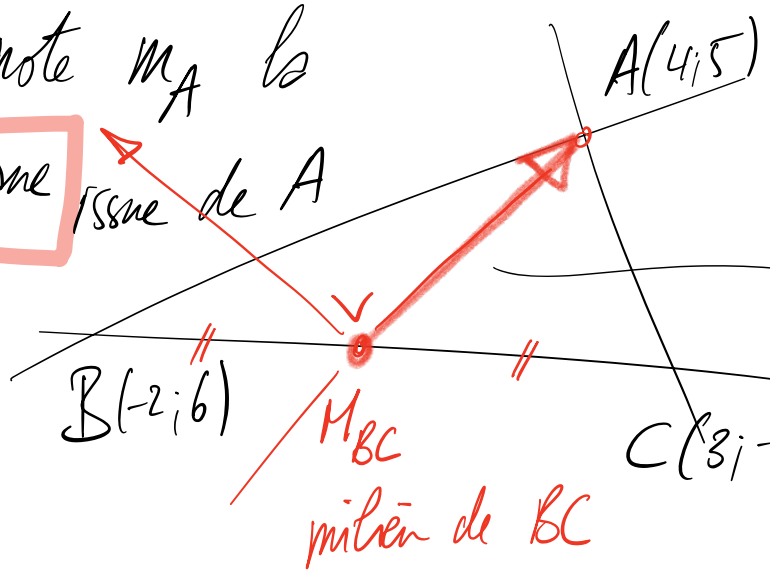
$-35 + k = 0$

$k = 35$

$h_A: 5x - 11y + 35 = 0$

$h_A: \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 4 \\ 5 \end{pmatrix} + m \cdot \begin{pmatrix} 11 \\ 5 \end{pmatrix}$

On note m_A la médiane issue de A

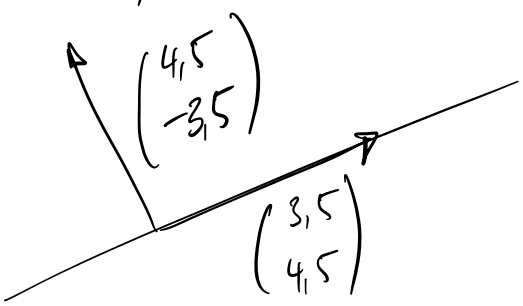


$$M_{BC} = \left(\frac{-2+3}{2} ; \frac{6-5}{2}\right)$$

$$= \left(\frac{1}{2} ; \frac{1}{2}\right)$$

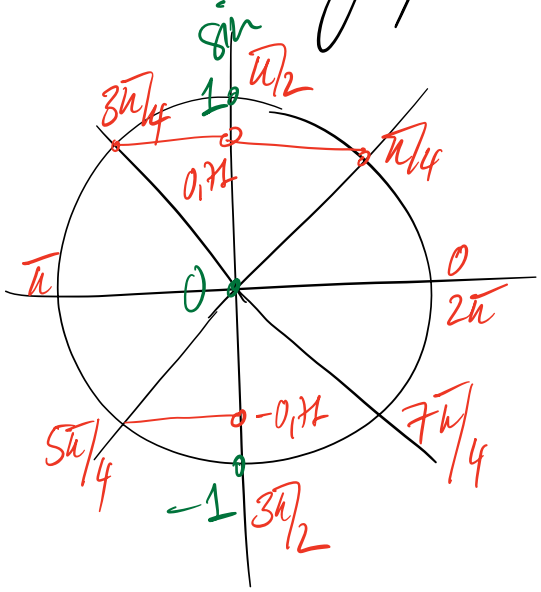
$$\overrightarrow{M_{BC}A} = \begin{pmatrix} 3,5 \\ 4,5 \end{pmatrix}$$

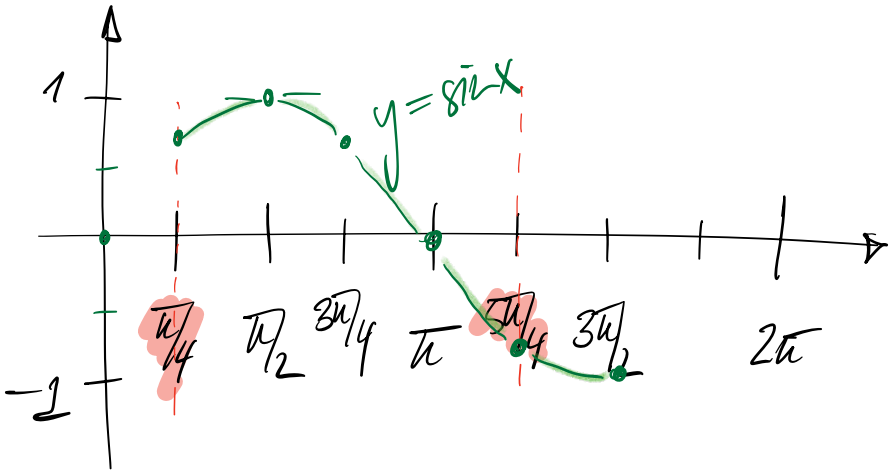
Par définition, m_A passe par A et M_{BC}.



$$4,5x - 3,5y + k = 0$$

Tracer le graphe de $\sin(x)$ pour $x \in \left[\frac{\pi}{4} ; \frac{5\pi}{4}\right]$

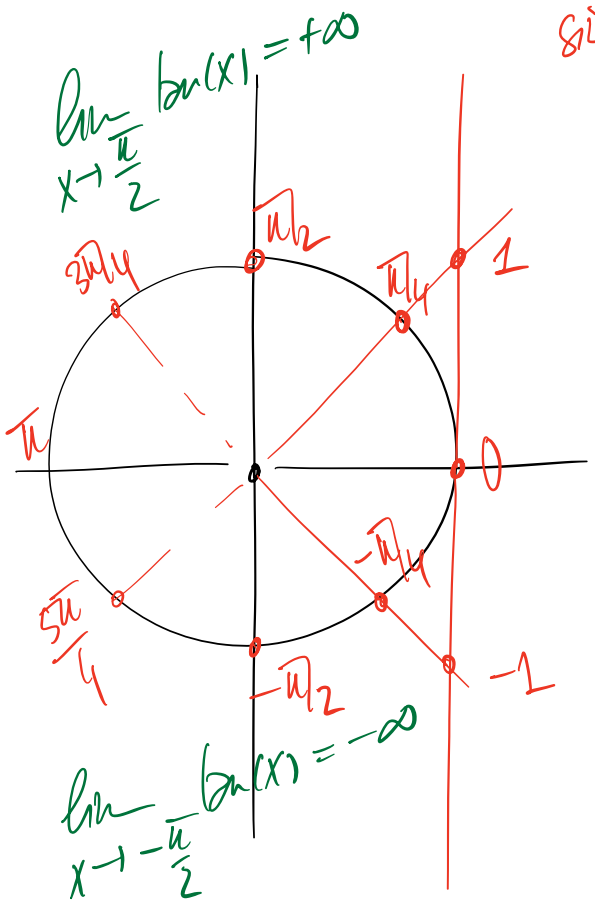




$\sin \frac{\pi}{4} \simeq 0,71$ $\quad \sin \frac{3\pi}{4} \simeq 0,71$

$\sin \frac{\pi}{2} = 1$ $\quad \sin \pi = 0$

$\sin \frac{5\pi}{4} \simeq -0,71$

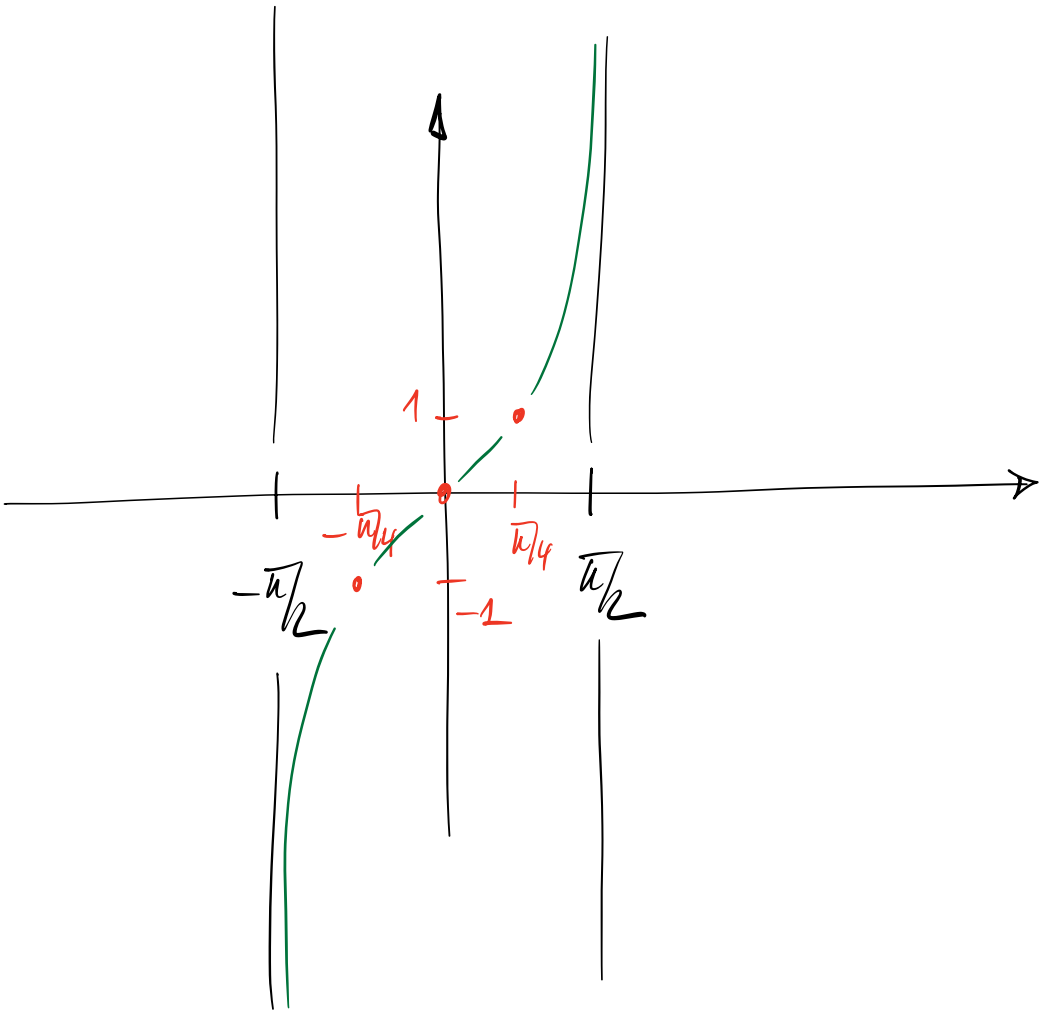


Tracer le graphe de $\tan(x)$ pour $x \in \left]-\frac{\pi}{2} ; \frac{\pi}{2}\right[$

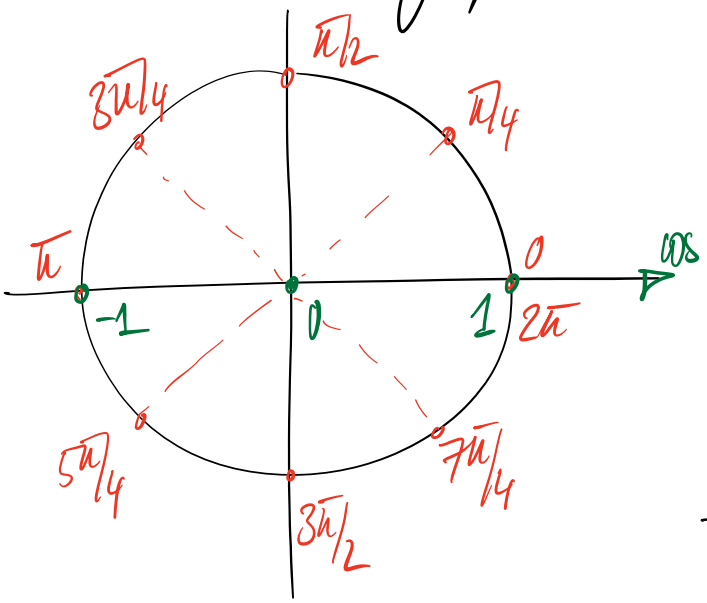
$\tan(0) = 0$

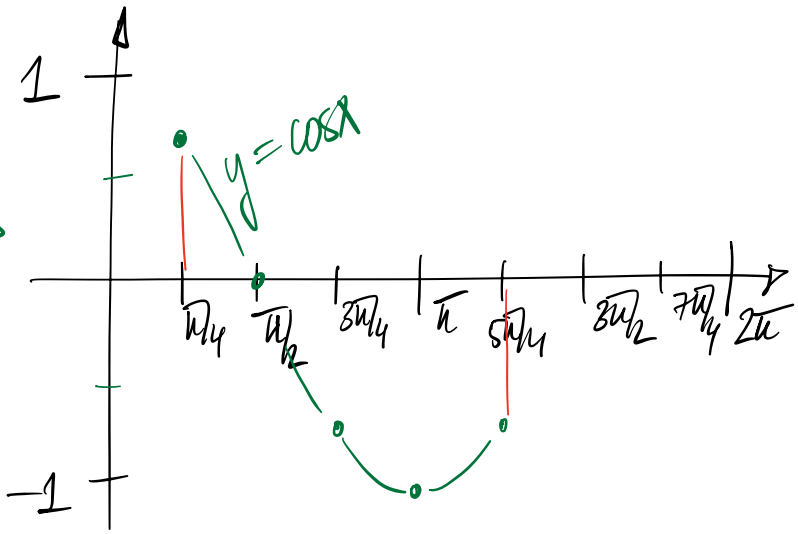
$\tan\left(\frac{\pi}{4}\right) = 1$

$\tan\left(-\frac{\pi}{4}\right) = -1$


1
−π/4
π/4
−π/2
π/2
−1

Dessiner le graphe de $\cos(x)$ pour $x \in [\pi/4 ; 5\pi/4]$





$\cos(0) = 1$

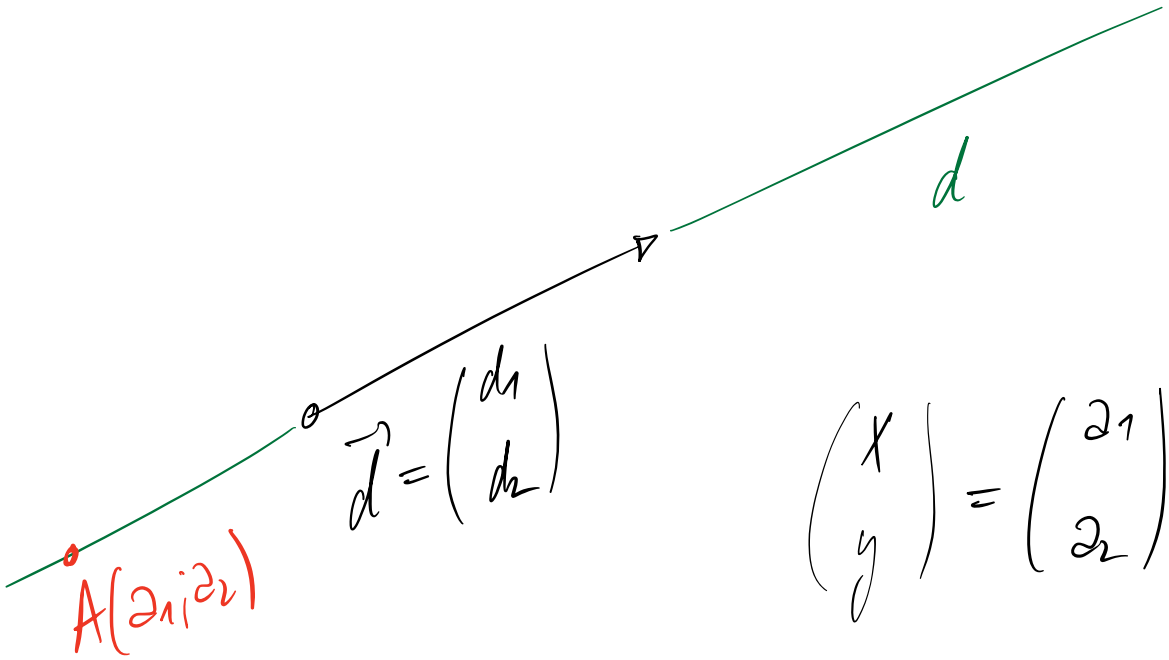
$\cos(\pi/4) = 0,71$

$\cos(\pi/2) = 0$

$\cos(3\pi/4) = -0,71$

$\cos(\pi) = -1$

$\cos(5\pi/4) = -0,71$



$\vec{d} = \begin{pmatrix} d_1 \\ d_2 \end{pmatrix}$

$$\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} a_1 \\ a_2 \end{pmatrix} + k \begin{pmatrix} d_1 \\ d_2 \end{pmatrix}$$

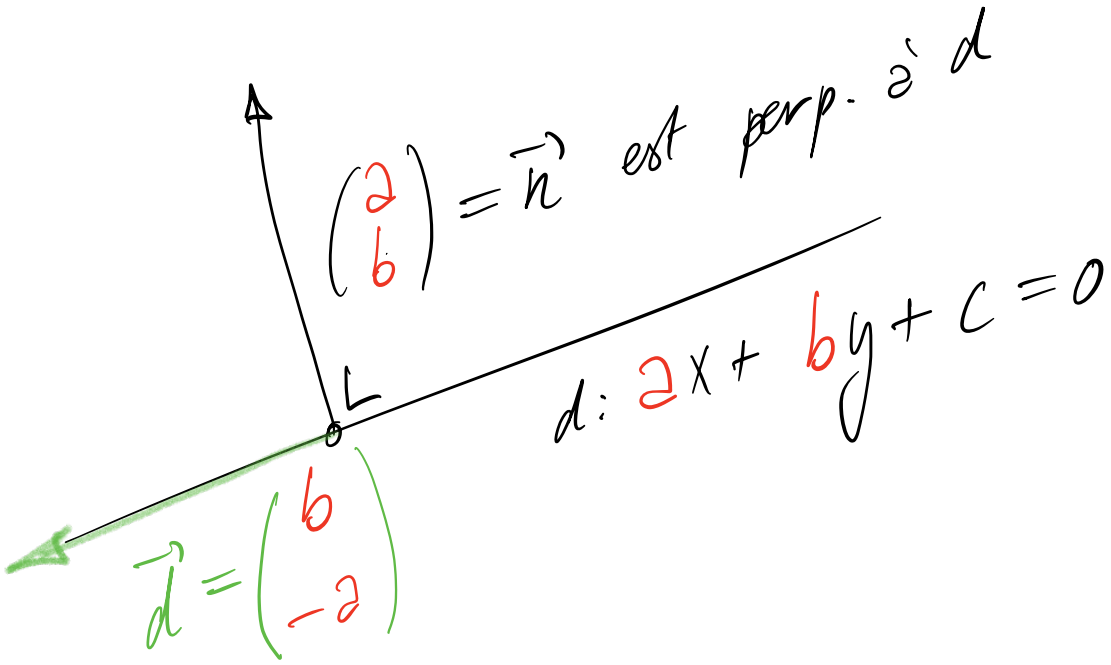
$$\begin{cases} x = a_1 + k d_1 \\ y = a_2 + k d_2 \end{cases} \qquad \begin{cases} k = \dfrac{x - a_1}{d_1} \\ k = \dfrac{y - a_2}{d_2} \end{cases}$$

$$\Rightarrow \quad \frac{x-a_1}{d_1} = \frac{y-a_2}{d_2} \quad \Leftrightarrow \quad d_2(x-a_1) = d_1(y-a_2)$$

$$\Rightarrow \quad d_2 x - d_2 a_1 = d_1 y - d_1 a_2$$

$$\Leftrightarrow \quad \boxed{d_2 x - d_1 y + d_1 a_2 - d_2 a_1 = 0}$$

$\begin{pmatrix} d_2 \\ -d_1 \end{pmatrix} \perp d$


$\begin{pmatrix} a \\ b \end{pmatrix} = \vec{n}$ est perp. à d
$d: ax + by + c = 0$
$\vec{d} = \begin{pmatrix} b \\ -a \end{pmatrix}$