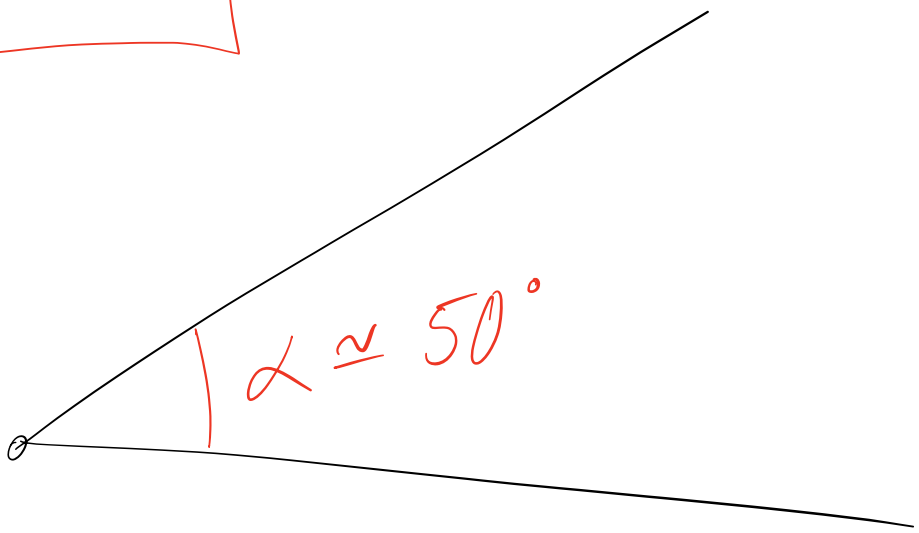
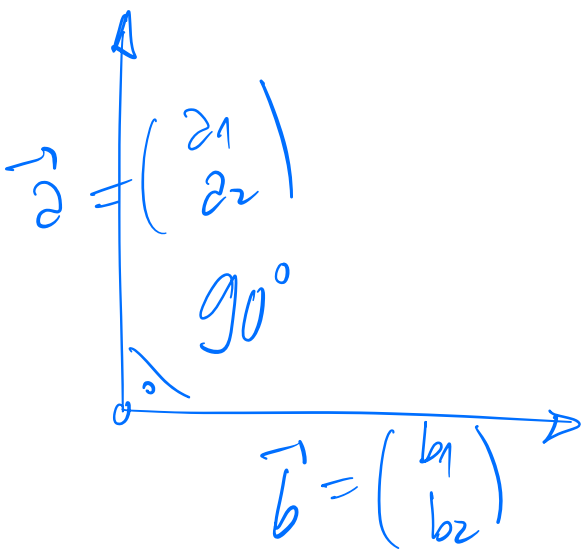
ANGLE

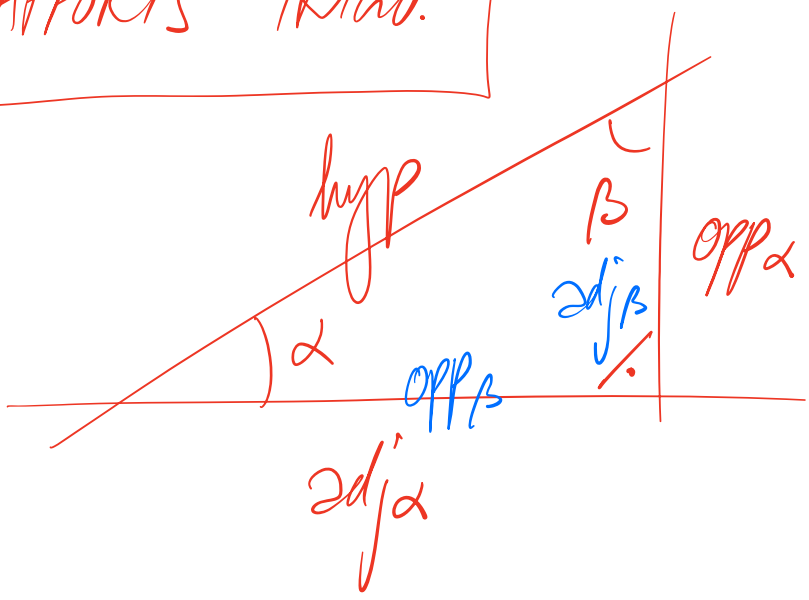




$$\vec{a} \perp \vec{b} \Leftrightarrow \vec{a} \cdot \vec{b} = 0$$

$$\Leftrightarrow a_1 b_1 + a_2 b_2 = 0$$

RAPPORTS TRIGO.

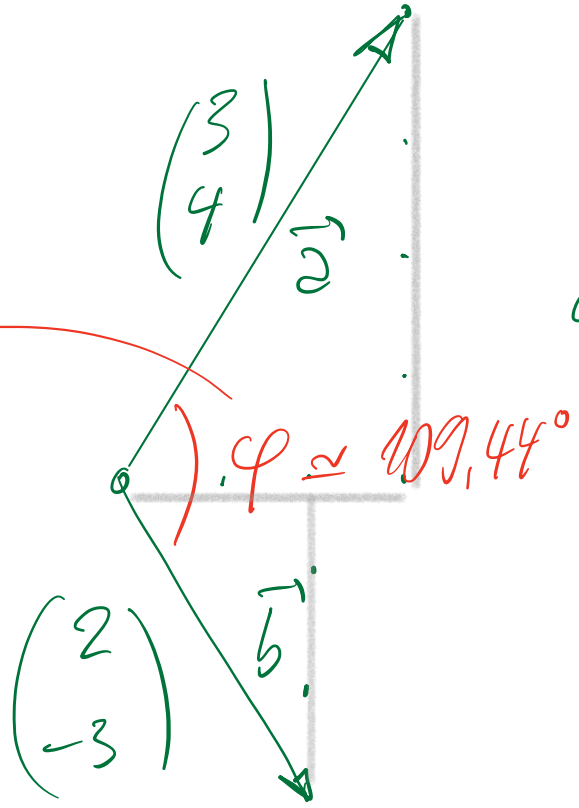


$$\cos\alpha = \frac{\text{adj}_\alpha}{\text{hyp}}$$

$$\sin\alpha = \frac{\text{opp}_\alpha}{\text{hyp}}$$

$$\tan\alpha = \frac{\text{opp}_\alpha}{\text{adj}_\alpha}$$

Example:



$$\cos\varphi = \frac{\vec{a}\cdot\vec{b}}{\|\vec{a}\|\cdot\|\vec{b}\|}$$

$\cos^{-1}$

$$\cos\varphi = \frac{3\cdot 2 + 4\cdot(-3)}{\sqrt{3^2+4^2}\ \sqrt{2^2+(-3)^2}} = \frac{-6}{5\sqrt{13}}$$

$$\simeq -0{,}332820$$

$$\cos^{-1}(-0{,}332820) = \varphi \simeq 109°$$

Application : $\vec{a} \cdot \vec{b} = a_1 b_1 + a_2 b_2$ / $\cos\varphi = \frac{\vec{a} \cdot \vec{b}}{\|\vec{a}\| \cdot \|\vec{b}\|}$

Calculer l'angle entre $\vec{a} = \begin{pmatrix} -10 \\ 2 \end{pmatrix}$ et $\vec{b} = \begin{pmatrix} 1 \\ 3 \end{pmatrix}$

$\vec{a} \cdot \vec{b} = \begin{pmatrix} -10 \\ 2 \end{pmatrix} \cdot \begin{pmatrix} 1 \\ 3 \end{pmatrix}$

$= -10 + 6 = -4$

$\cos\varphi = \frac{-4}{\sqrt{104} \cdot \sqrt{10}} \simeq -0{,}124$

$\varphi \simeq 97°$

$\vec{a} = \begin{pmatrix} a_1 \\ a_2 \end{pmatrix}$ $\vec{b} = \begin{pmatrix} b_1 \\ b_2 \end{pmatrix}$

$\|\vec{a}\| = \sqrt{a_1^2 + a_2^2}$

$= \sqrt{100+4}$

$= \sqrt{104}$

$\|\vec{b}\| = \sqrt{1+9}$

$= \sqrt{10}$