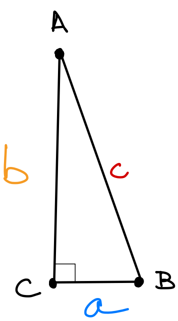
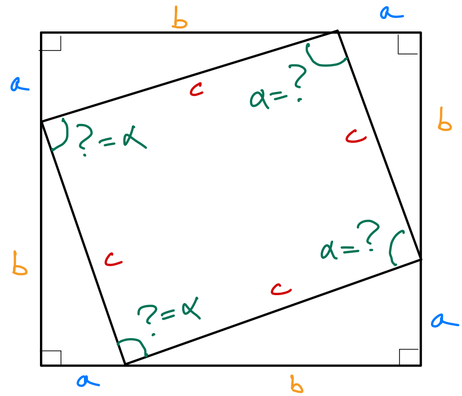
Structures fondamentales en spi — CM1

Mesurer des longueurs

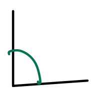
Le théorème de Pythagore



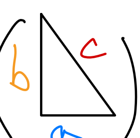
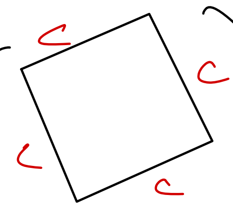
$$\boxed{a^2 + b^2 = c^2}$$

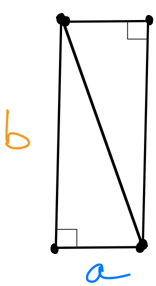


carré de côté $a+b$ d'aire : $\mathcal{A} = (a+b)^2$

Si on sait que  est droit alors

alors le quadrilatère intérieur est un carré.

$\mathcal{A} = 4 \times$ aire () + aire ()

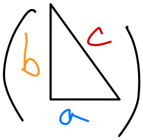
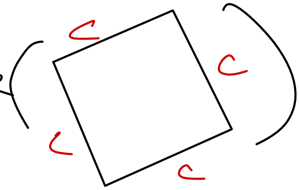


$2 \times$ aire (triangle) = aire (rectangle)

$= ab$

aire (triangle) $= \dfrac{ab}{2}$

$t = (a+b)^2$

$t =$ 4 × aire () + aire ()

$= 4 \times \frac{ab}{2} + c^2$

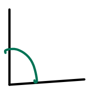
donc $(a+b)^2 = \cancel{2ab} + c^2$

$\parallel$

$a^2+b^2+\cancel{2ab}$

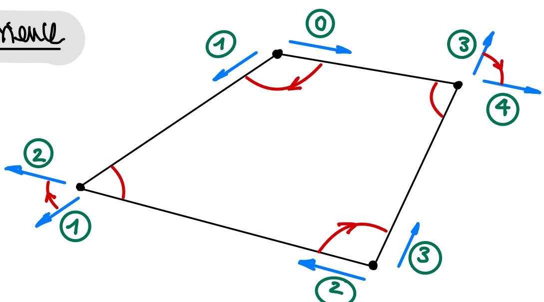
$\Longrightarrow \boxed{a^2+b^2=c^2}$

OKs

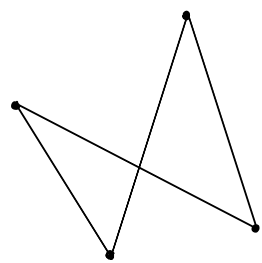
 est droit ?

la somme des angles d'un quadrilatère vaut $2\pi = 360°$

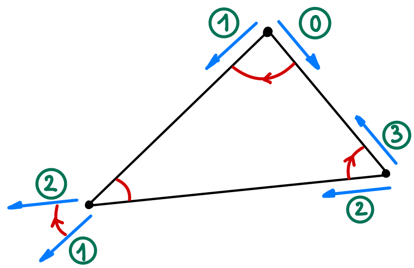
Expérience



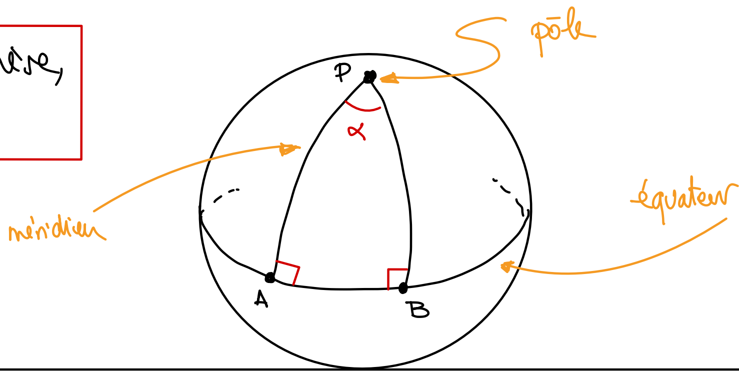
bon quadrilatère



mauvais quadrilatère



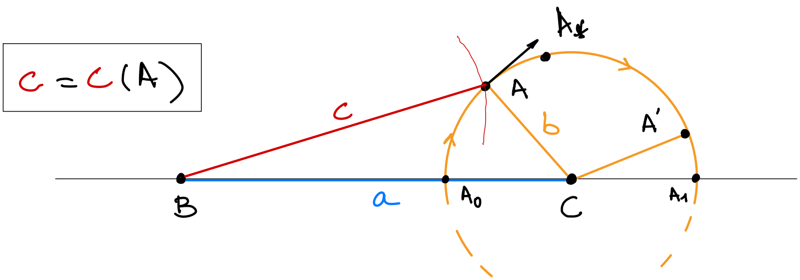
Sur une sphère, c'est faux



Le théorème de Pythagore énonce une réalité φque de l'espace plat.

Réciproque de Pythagore

Dans un plan, si un triangle ABC est tel que $a^2+b^2=c^2$, alors c'est un triangle rectangle en C



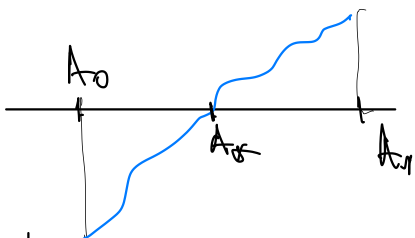
En A_0, $c(A_0) = a-b$. En A_1, $c(A_1) = a+b$

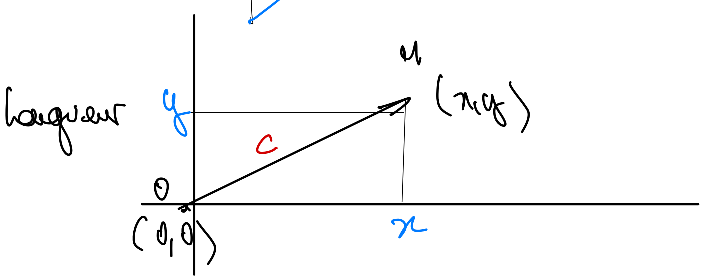
$c(A)$ croît strictement entre $a-b$ et $a+b$

et continue.

il existe un unique A_*

tel que $a^2+b^2 = c(A_*)^2$

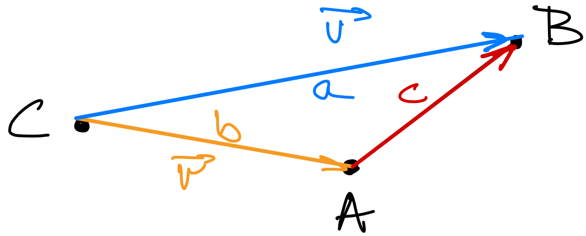




$$c^2 = x^2+y^2$$

$$\text{longueur}(\vec{OM}) = \sqrt{x^2+y^2} = \sqrt{\vec{OM}\cdot\vec{OM}} = \sqrt{\|\vec{OM}\|^2}$$

$(x,y)\cdot(x,y) = x^2+y^2.$



$\vec{u} = \vec{v} + \overrightarrow{AB}$ $\qquad$ $\overrightarrow{AB} = \vec{u} - \vec{v}$

$$c^2 = \|\overrightarrow{AB}\|^2 = \|\vec{u}-\vec{v}\|^2 = \underbrace{\|\vec{u}\|^2 + \|\vec{v}\|^2}_{a^2 + b^2} - 2\,\vec{u}\cdot\vec{v}$$

On a $\quad a^2+b^2 = c^2 \iff \vec{u}\cdot\vec{v} = 0$

$\Updownarrow$

$\vec{u}$ et $\vec{v}$ sont perpendiculaires