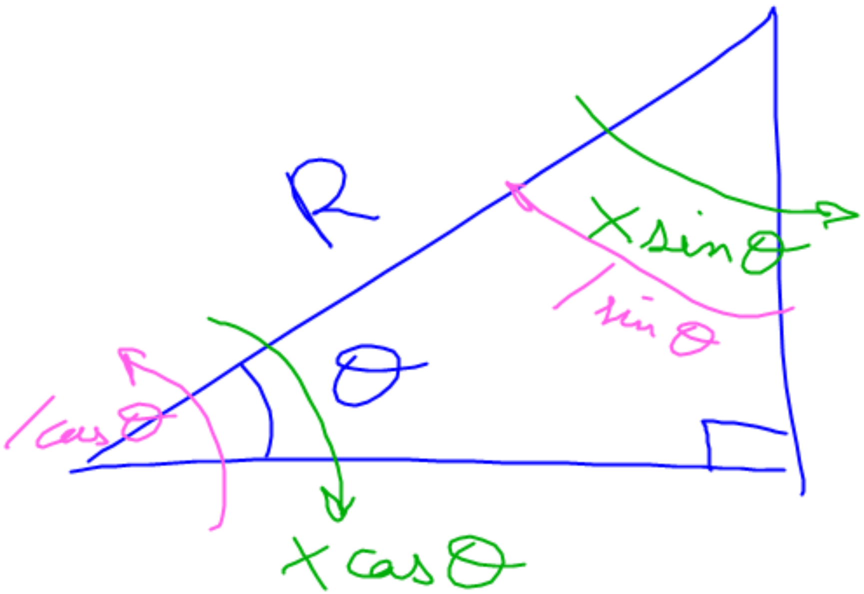
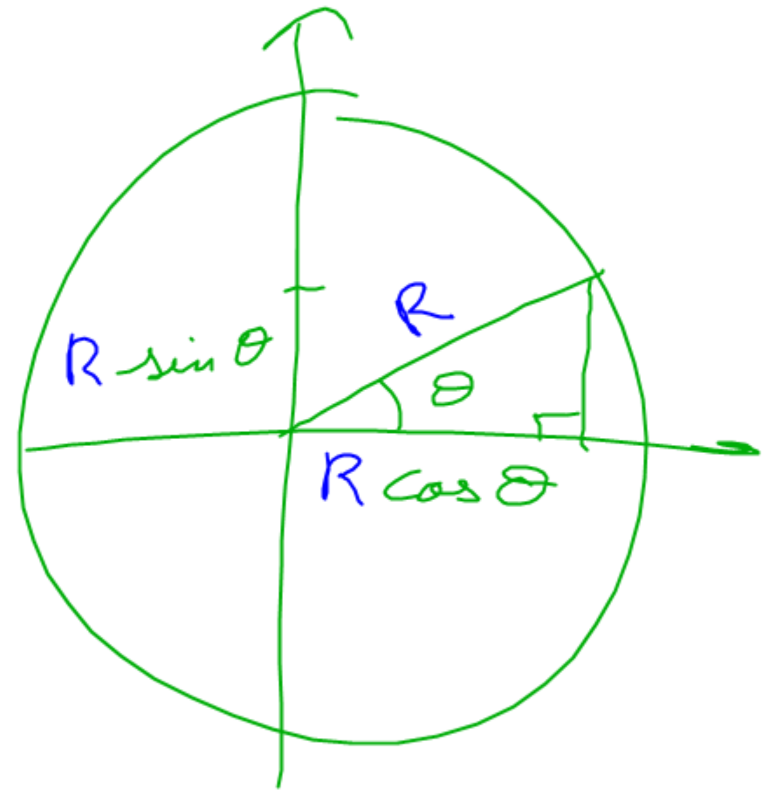
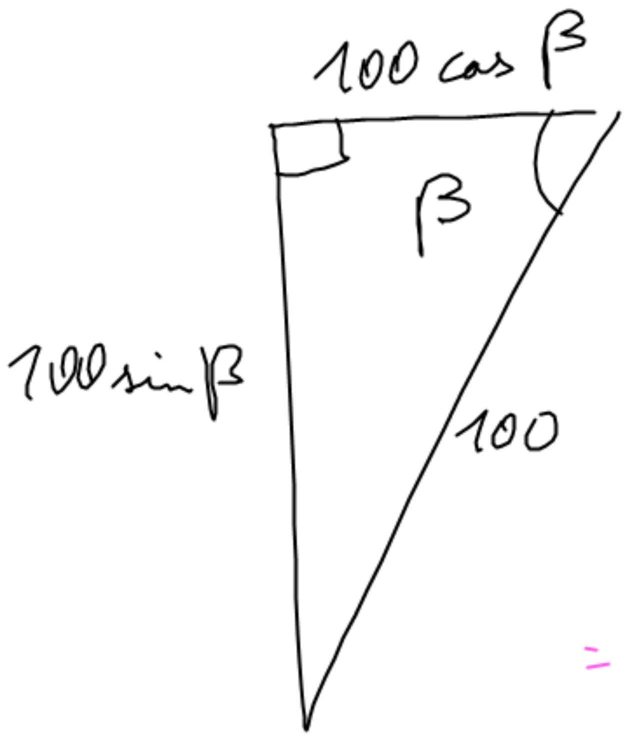
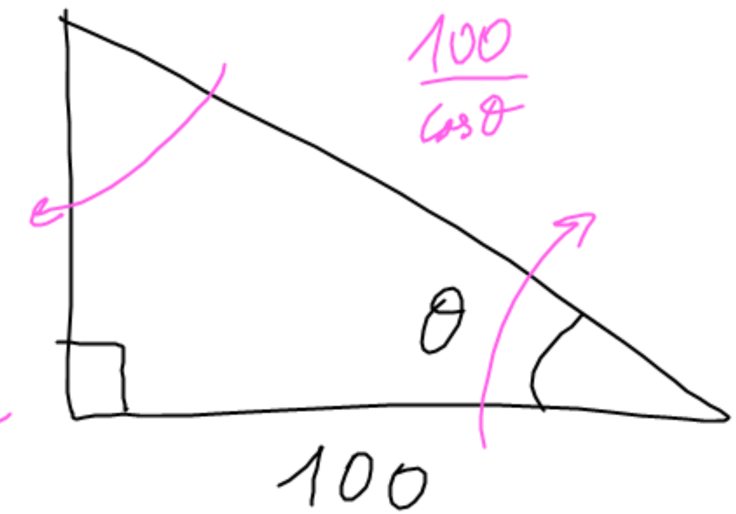

R
θ
X sin θ
1 sin θ
1 cos θ
X cos θ

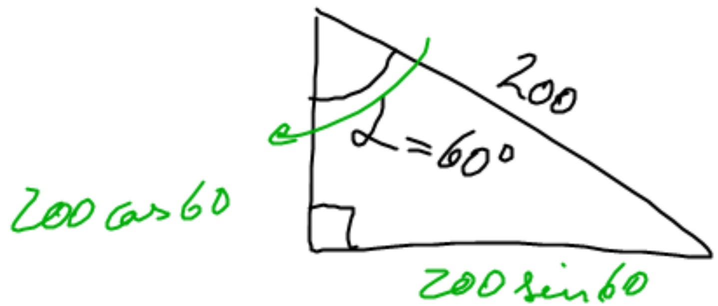

R
θ
R sin θ
R cos θ

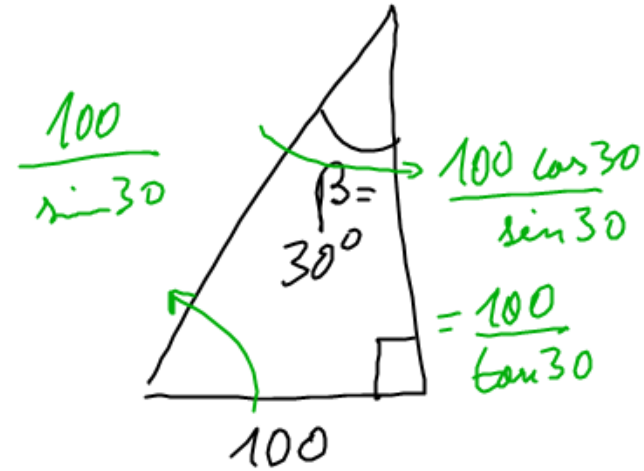
$$\tan\alpha = \frac{\sin\alpha}{\cos\alpha}$$

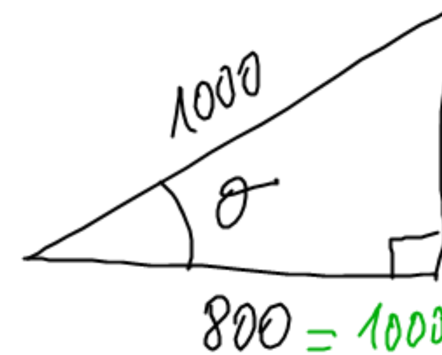




$$\frac{100\sin\theta}{\cos\theta} = 100\tan\theta$$







$800 = 1000 \cdot \cos\theta$

$$\cos\theta = \frac{800}{1000}$$

$$\theta = \cos^{-1}(0{,}8)$$

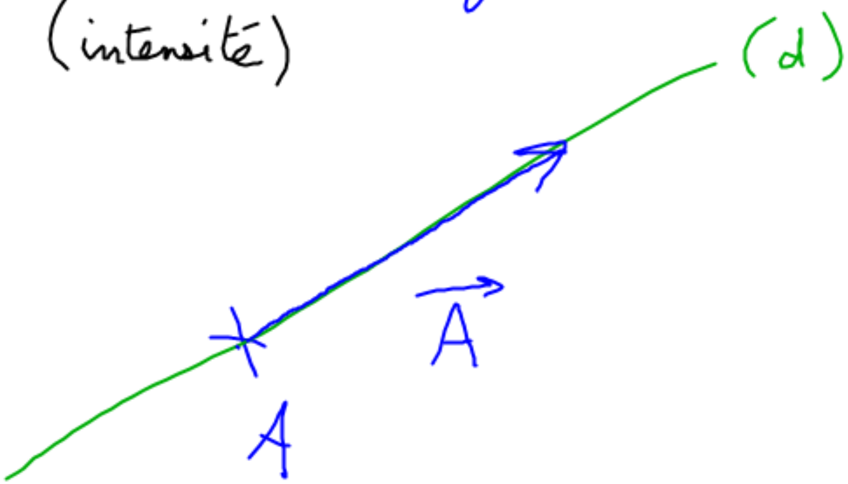
$$\theta \simeq 36{,}9^{\circ}$$

$$\theta \simeq 0{,}64 \text{ rad}$$

2. Vecteurs

Graphique

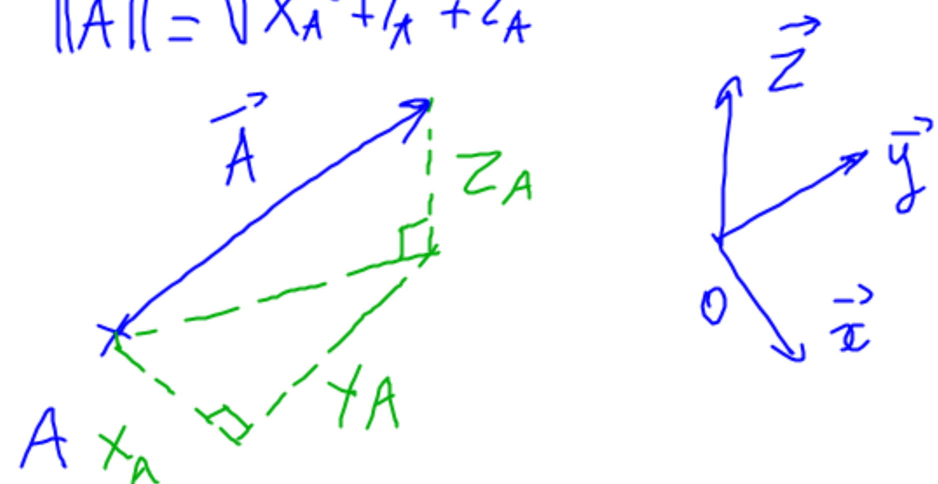
- point d'app : A
- direction : (d)
- sens : $\nearrow$
- norme : longueur (intensité)

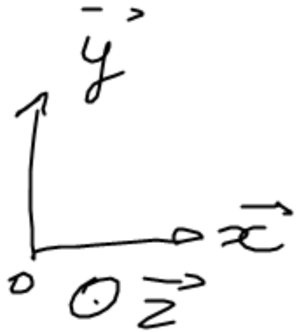


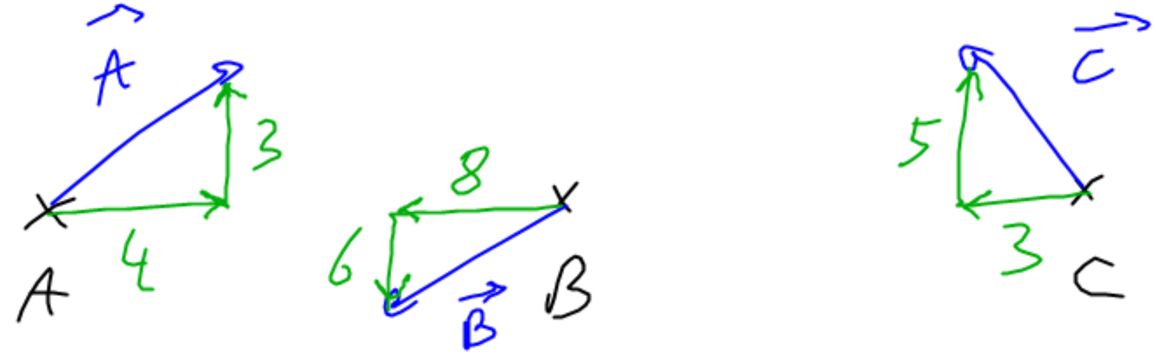
Analytique

- point d'appl : A
- coordonnées : $\vec{A} = \begin{pmatrix} X_A \\ Y_A \\ Z_A \end{pmatrix}$

$$\|\vec{A}\| = \sqrt{X_A^2 + Y_A^2 + Z_A^2}$$



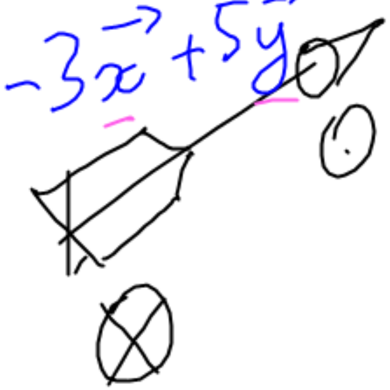




$$\vec{A} = \begin{pmatrix} 4 \\ 3 \\ 0 \end{pmatrix} = \begin{pmatrix} -4 \\ 0 \\ -3 \end{pmatrix} \quad \vec{B} = \begin{pmatrix} -8 \\ -6 \\ 0 \end{pmatrix} \quad \vec{C} = \begin{pmatrix} -3 \\ 5 \\ 0 \end{pmatrix}$$

$$\|\vec{A}\| = \sqrt{4^2+3^2} = 5 \qquad \|\vec{B}\| = \sqrt{8^2+6^2} = 10 \qquad \|\vec{C}\| = \sqrt{3^2+5^2}$$

$$\vec{C} = -3\vec{x} + 5\vec{y}$$



$$\vec{x} = \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix} \qquad \vec{A} = 4.\vec{x} + 3.\vec{y}$$

Produit scalaire :

$$\vec{u} \cdot \vec{v} = \|\vec{u}\| \cdot \|\vec{v}\| \cdot \cos(\vec{u}, \vec{v})$$

$$\vec{u} \cdot \vec{v} = \begin{pmatrix} u_x & v_x \\ u_y & v_y \\ u_z & v_z \end{pmatrix} = u_x v_x + u_y v_y + u_z v_z$$

Permet de trouver l'angle entre $\vec{u}$ et $\vec{v}$

$$\vec{A} \cdot \vec{B} = 5 \cdot 10 \cdot \cos(\vec{A}, \vec{B})$$

$$\vec{A} \cdot \vec{B} = \begin{pmatrix} 4 & -8 \\ 3 & -6 \\ 0 & 0 \end{pmatrix} = -32 - 18$$

$$= -50$$

$$-50 = 50 \cdot \cos(\vec{A}, \vec{B})$$

$$\cos(\vec{A}, \vec{B}) = -1 \qquad (\vec{A}, \vec{B}) = \cos^{-1}(-1) = 180^\circ$$

$$\vec{A} \cdot \vec{x} = \begin{pmatrix} 4 \\ 3 \\ 0 \end{pmatrix} \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix} = 4$$

Extraire la coordonnée en $\vec{x}$ du vecteur

$$\vec{F} + \vec{E} = \vec{G}$$

$$\begin{pmatrix} -3 \\ 3 \\ 0 \end{pmatrix} + \begin{pmatrix} X_E \\ Y_E \\ 0 \end{pmatrix} = \begin{pmatrix} -8 \\ -4 \\ 0 \end{pmatrix}$$

$$\vec{F} \cdot \vec{x} + \vec{E} \cdot \vec{x} = \vec{G} \cdot \vec{x}$$

$$-3 + X_E = -8$$

$$X_E = -8 + 3 = -5$$

Produit vectoriel :

$$\vec{u} \wedge \vec{v} = \|\vec{u}\| \cdot \|\vec{v}\| \cdot \sin(\vec{u}, \vec{v}) \cdot \vec{w}$$