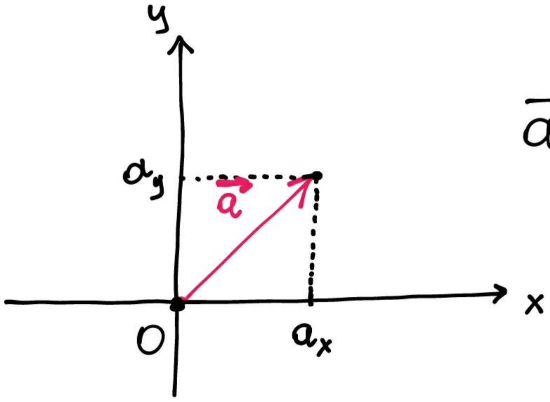
LE COMPONENTI CARTESIANE DI UN VETTORE



$\vec{a} = (a_x, a_y)$

a_x e a_y SONO LE COMPONENTI CARTESIANE DEL VETTORE $\vec{a}$

SOMMA VETTORIALE

$\vec{a} = (a_x, a_y) \qquad \vec{b} = (b_x, b_y)$

$$\vec{a} + \vec{b} = (a_x + b_x, a_y + b_y)$$

$$\vec{a} - \vec{b} = (a_x - b_x, a_y - b_y)$$

PRODOTTO PER UNO SCALARE

$$k\vec{a} = (ka_x, ka_y)$$

esempio $\vec{a} = (-1, 3)$ $\quad 2\vec{a} = (-2, 6)$

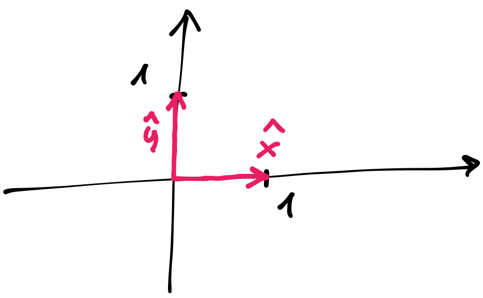
$k \in \mathbb{R}$ NUMERO!

VERSORI DEGLI ASSI CARTESIANI

VERSORE = VETTORE DI LUNGHEZZA 1

$\hat{x} = (1, 0)$

$\hat{y} = (0, 1)$



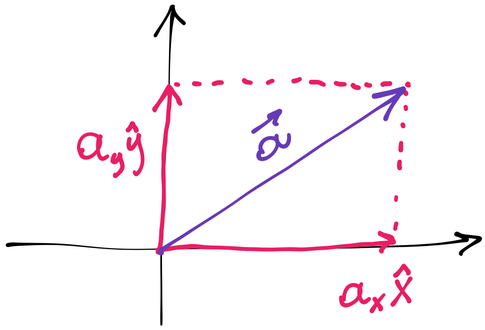
OGNI VETTORE $\vec{a} = (a_x, a_y)$ SI PUÒ SCRIVERE ANCHE

$$\vec{a} = a_x \hat{x} + a_y \hat{y} = a_x (1, 0) + a_y (0, 1) = (a_x, 0) + (0, a_y) = (a_x, a_y)$$

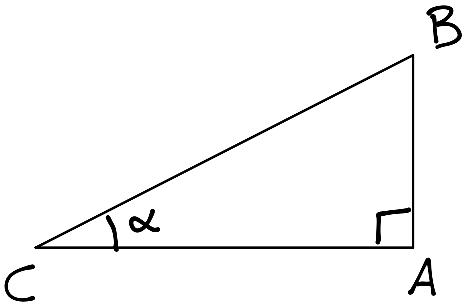
Scrivere il vettore $\vec{a}=(a_x, a_y)$ come

$$\vec{a}=a_x\,\hat{x}+a_y\,\hat{y}$$

significa visualizzare $\vec{a}$ come somma di due vettori perpendicolari



TRIGONOMETRIA

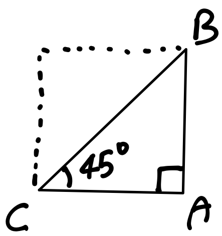


CATETO OPPOSTO AD α $\quad \overline{AB}=\overline{BC}\cdot\sin\alpha$

CATETO ADIACENTE AD α $\quad \overline{AC}=\overline{BC}\cdot\cos\alpha$

ANGOLI PARTICOLARI

1) $\alpha=45°$

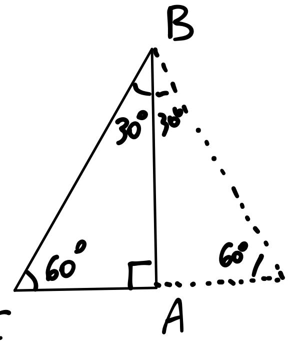


$$\boxed{d=l\cdot\sqrt{2} \Rightarrow \frac{l}{d}=\frac{1}{\sqrt{2}}=\frac{\sqrt{2}}{2}}$$

$$\overline{AB}=\overline{BC}\cdot\sin 45°$$
$$\Downarrow$$
$$\sin 45°=\frac{\overline{AB}}{\overline{BC}}=\frac{\sqrt{2}}{2}$$

$$\overline{AC}=\overline{BC}\cos 45°$$
$$\Downarrow$$
$$\cos 45°=\frac{\sqrt{2}}{2}$$

2)



$\overline{AC} = \frac{1}{2}\,\overline{BC}$

$\overline{AB} = \frac{\sqrt{3}}{2}\,\overline{BC}$ (dal teorema di Pitagora)

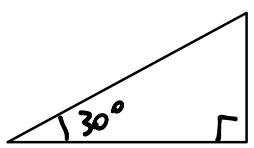
$$\overline{AB} = \sqrt{\overline{BC}^2 - \overline{AC}^2} = \sqrt{\overline{BC}^2 - \frac{1}{4}\overline{BC}^2} =$$

$$= \sqrt{\frac{3}{4}\overline{BC}^2} = \frac{\sqrt{3}}{2}\,\overline{BC}$$

$\sin 60° = \frac{\sqrt{3}}{2}$

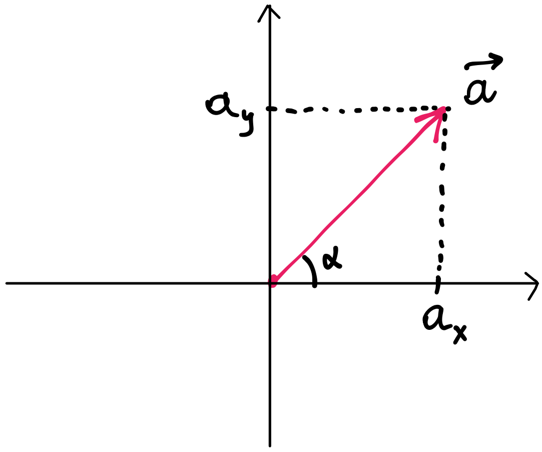
$\cos 60° = \frac{1}{2}$

3) SI RAGIONA ALLO STESSO MODO PER $\alpha = 30°$



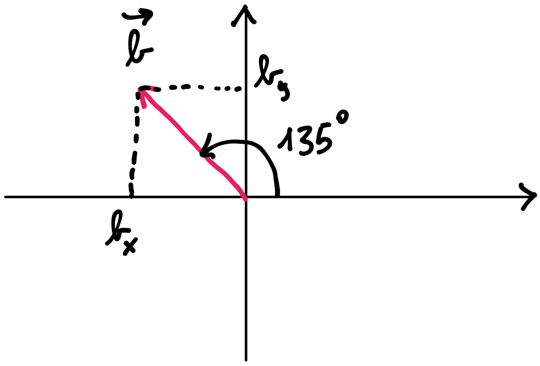
$\sin 30° = \frac{1}{2}$

$\cos 30° = \frac{\sqrt{3}}{2}$



$$\vec{a} = \begin{cases} a_x = a \cdot \cos\alpha \\ a_y = a \cdot \sin\alpha \end{cases}$$

$$a = |\vec{a}| = \sqrt{a_x^2 + a_y^2}$$



$$b = 3$$

$$b_x = b \cdot \cos 135^\circ =$$
$$= 3 \cdot (-0{,}7071\ldots) \simeq$$
$$\simeq -2{,}12$$

$$b_y = b \cdot \sin 135^\circ =$$
$$= 3 \cdot 0{,}70\ldots \simeq 2{,}12$$