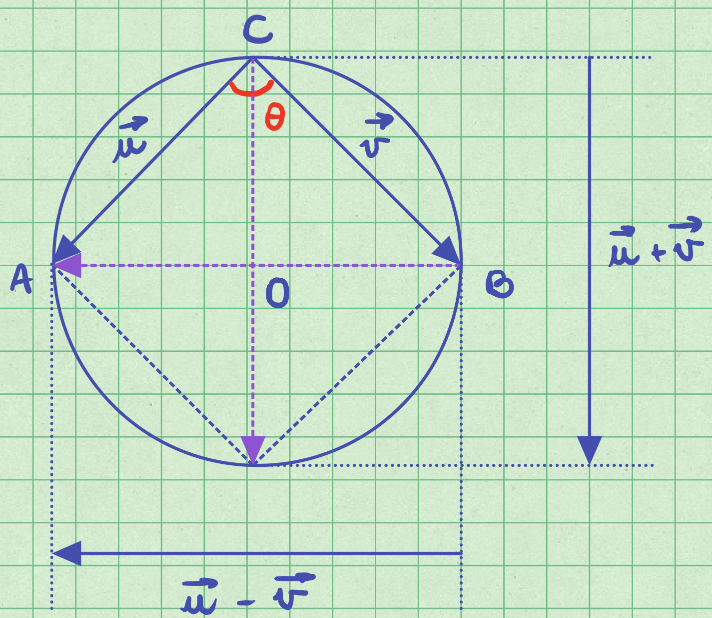
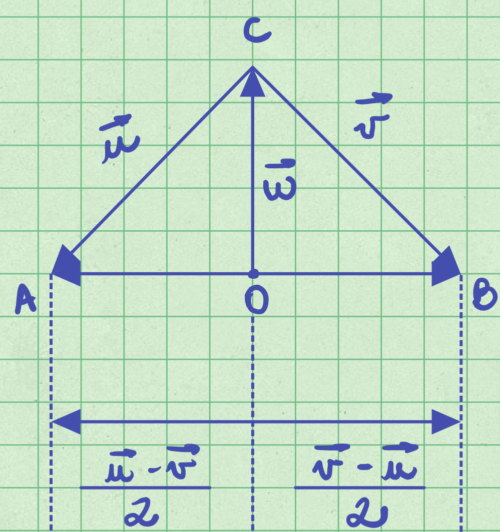
16. c)



$\theta = ?$

$\theta = \measuredangle\, \vec{u}, \vec{v}$



$\vec{OA}$ e $\vec{OB}$ ... opostos

$$\vec{OB} = -\vec{OA} = -\left(\frac{1}{2}(\vec{u} - \vec{v})\right)$$

$$\vec{OB} = \frac{1}{2}(\vec{v} - \vec{u})$$

$$\Delta COB: \quad \vec{v} = \left(\frac{\vec{v} - \vec{u}}{2}\right) - \vec{w} \qquad (1)$$

$$\Delta COA: \quad \vec{u} = \left(\frac{\vec{u} - \vec{v}}{2}\right) - \vec{w} \qquad (2)$$

$$\therefore \ \vec{u} \cdot \vec{v} = \left[\left(\frac{\vec{u} - \vec{v}}{2}\right) - \vec{w}\right] \cdot \left[\left(\frac{\vec{v} - \vec{u}}{2}\right) - \vec{w}\right]$$

$$= \left[\frac{1}{2}(\vec{u} - \vec{v}) - \vec{w}\right] \cdot \frac{1}{2}(\vec{v} - \vec{u}) -$$

$$\left[\frac{1}{2}(\vec{u} - \vec{v}) - \vec{w}\right] \cdot \vec{w}$$

$$\frac{1}{2}\vec{w} \cdot (-1)(\vec{u} - \vec{v})$$

$$= \frac{1}{4}(\vec{u}-\vec{v})\cdot(\vec{v}-\vec{u}) - \boxed{\frac{1}{2}\vec{w}\cdot(\vec{v}-\vec{u})} -$$

$$\frac{1}{2}(\vec{u}-\vec{v})\cdot\vec{w} + \vec{w}\cdot\vec{w}$$

$$= \frac{1}{4}(\vec{u}-\vec{v})\cdot(-1)(\vec{u}-\vec{v}) + \cancel{\frac{1}{2}\vec{w}\cdot(\vec{u}-\vec{v})} -$$

$$\cancel{\frac{1}{2}\vec{w}\cdot(\vec{u}-\vec{v})} + \vec{w}\cdot\vec{w}$$

$$\vec{u}\cdot\vec{v} = |\vec{w}|^2 - \frac{1}{4}|\vec{u}-\vec{v}|^2 \qquad (3)$$

De (1) ou (2):

$$\vec{w} = -\frac{1}{2}(\vec{u}+\vec{v}) \quad \therefore \quad |\vec{w}| = \frac{1}{2}|\vec{u}+\vec{v}|$$

$$\longrightarrow |\vec{w}|^2 = \frac{1}{4}|\vec{u}+\vec{v}|^2$$

Substituindo $|\vec{w}|^2$ em (3):

$$\vec{u}\cdot\vec{v} = \frac{1}{4}|\vec{u}+\vec{v}|^2 - \frac{1}{4}|\vec{u}-\vec{v}|^2$$

Da circunferência:

$$|\vec{u}+\vec{v}| = |\vec{u}-\vec{v}| = d \quad , \quad d \dots \text{diâmetro}$$

Portanto:

$$\vec{u}\cdot\vec{v} = 0$$

Como $\vec{u}, \vec{v} \neq \vec{0}$ e $\vec{u}\cdot\vec{v} = 0$, $\theta = \pi/2$

Dúvidas:

1 (RNP) ; 2 (PV)