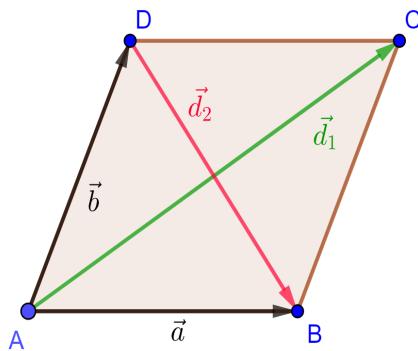




Vektorgeometrie

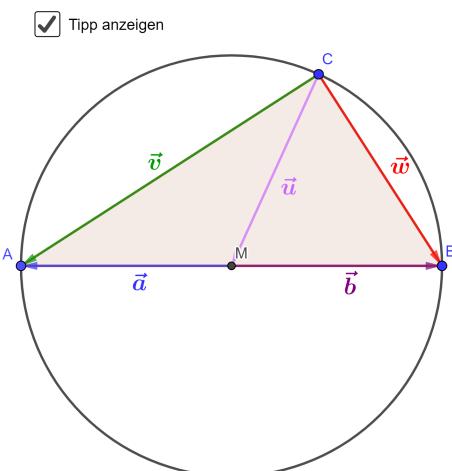
Lösung

a)



$$\begin{aligned} |\vec{a}| = |\vec{b}| &\Leftrightarrow \sqrt{a_1^2 + a_2^2} = \sqrt{b_1^2 + b_2^2} \Leftrightarrow a_1^2 + a_2^2 = b_1^2 + b_2^2 \\ \vec{d}_1 &= \vec{a} + \vec{b} \quad \wedge \quad \vec{d}_2 = \vec{a} - \vec{b} \\ \vec{d}_1 \circ \vec{d}_2 &= (\vec{a} + \vec{b}) \circ (\vec{a} - \vec{b}) \stackrel{\substack{3. \\ \text{binomische} \\ \text{Formel}}}{=} \vec{a}^2 - \vec{b}^2 \stackrel{\vec{a}=\vec{b}}{=} \vec{a}^2 - \vec{a}^2 = 0 \end{aligned}$$

b)





Vektorgeometrie

$$\vec{b} = -\vec{a}$$

$$\vec{v} = \vec{u} + \vec{a} \quad \wedge \quad \vec{w} = \vec{u} + \vec{b} = \vec{u} - \vec{a}$$

$$|\vec{u}| = |\vec{a}| \Leftrightarrow \sqrt{u_1^2 + u_2^2} = \sqrt{a_1^2 + a_2^2} \Leftrightarrow u_1^2 + u_2^2 = a_1^2 + a_2^2 \Leftrightarrow u_1^2 - a_1^2 + u_2^2 - a_2^2 = 0$$

$$\stackrel{3.}{\Leftrightarrow} (u_1 - a_1) \cdot (u_1 + a_1) + (u_2 - a_2) \cdot (u_2 + a_2) = 0$$

binomische
Formel

$$\Leftrightarrow (\vec{u} - \vec{a}) \circ (\vec{u} + \vec{a}) = 0 \Leftrightarrow (\vec{u} + \vec{b}) \circ (\vec{u} + \vec{a}) = 0 \Leftrightarrow \vec{w} \circ \vec{v} = 0$$



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