

Lösungen zu Aufgaben zu Winkel zwischen Vektoren (2) Winkel Berechnung

$$\begin{aligned}\text{a) } |\vec{a}| &= \sqrt{(\sqrt{8})^2 + (\sqrt{8})^2} = 4 \\ |\vec{b}| &= \sqrt{1^2 + 0^2} = 1 \\ \frac{\vec{a} \circ \vec{b}}{|\vec{a}| \cdot |\vec{b}|} &= \frac{\begin{pmatrix} \sqrt{8} \\ \sqrt{8} \end{pmatrix} \circ \begin{pmatrix} 1 \\ 0 \end{pmatrix}}{4 \cdot 1} = \frac{1}{\sqrt{2}} \\ \Rightarrow \alpha &= \arccos\left(\frac{1}{\sqrt{2}}\right) = 45^\circ\end{aligned}$$

$$\begin{aligned}|\vec{a}| &= \sqrt{(\sqrt{3})^2 + 1^2} = 2 \\ |\vec{b}| &= \sqrt{(\sqrt{3})^2 + 0^2} = \sqrt{3}\end{aligned}$$

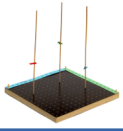
$$\begin{aligned}\text{b) } \frac{\vec{a} \circ \vec{b}}{|\vec{a}| \cdot |\vec{b}|} &= \frac{\begin{pmatrix} \sqrt{3} \\ 1 \end{pmatrix} \circ \begin{pmatrix} \sqrt{3} \\ 0 \end{pmatrix}}{2 \cdot \sqrt{3}} = \frac{3}{2 \cdot \sqrt{3}} = \frac{\sqrt{3}}{2} \\ \Rightarrow \alpha &= \arccos\left(\frac{\sqrt{3}}{2}\right) = 30^\circ\end{aligned}$$

$$\begin{aligned}\text{c) } |\vec{a}| &= \sqrt{\left(-\frac{\sqrt{3}}{2}\right)^2 + \left(\frac{3}{2}\right)^2} = \sqrt{3} \\ |\vec{b}| &= \sqrt{2^2 + 0^2} = 2 \\ \frac{\vec{a} \circ \vec{b}}{|\vec{a}| \cdot |\vec{b}|} &= \frac{\begin{pmatrix} -\frac{\sqrt{3}}{2} \\ \frac{3}{2} \end{pmatrix} \circ \begin{pmatrix} 2 \\ 0 \end{pmatrix}}{2 \cdot \sqrt{3}} = \frac{-\sqrt{3}}{2 \cdot \sqrt{3}} = -\frac{1}{2} \\ \Rightarrow \alpha &= \arccos\left(-\frac{1}{2}\right) = 120^\circ\end{aligned}$$

$$\begin{aligned}\text{d) } |\vec{a}| &= \sqrt{3^2 + 2,64^2} \approx 4 \\ |\vec{b}| &= \sqrt{\left(\frac{1}{2}\right)^2 + 0^2} = \frac{1}{2} \\ \frac{\vec{a} \circ \vec{b}}{|\vec{a}| \cdot |\vec{b}|} &= \frac{\begin{pmatrix} 3 \\ 2,64 \end{pmatrix} \circ \begin{pmatrix} \frac{1}{2} \\ 0 \end{pmatrix}}{4 \cdot \frac{1}{2}} = \frac{\frac{3}{2}}{2} = -\frac{3}{4} \\ \Rightarrow \alpha &= \arccos\left(-\frac{3}{4}\right) \approx 113,1^\circ\end{aligned}$$

$$\begin{aligned}\text{e) } |\vec{a}| &= \sqrt{2,35^2 + 0^2} = 2,35 \\ |\vec{b}| &= \sqrt{(-5)^2 + 12^2} = 13 \\ \frac{\vec{a} \circ \vec{b}}{|\vec{a}| \cdot |\vec{b}|} &= \frac{\begin{pmatrix} 2,35 \\ 0 \end{pmatrix} \circ \begin{pmatrix} -5 \\ 12 \end{pmatrix}}{2,35 \cdot 13} = \frac{-11,75}{30,55} \approx -0,3846 \\ \Rightarrow \alpha &\approx \arccos(-0,3846) \approx 112,6^\circ\end{aligned}$$





Vektoren Bestimmen

a) $\vec{a} \approx \begin{pmatrix} 2 \\ \pm 4,6 \end{pmatrix}$

c) $\vec{a} \approx \begin{pmatrix} 0,45 \\ \pm 0,22 \end{pmatrix}$

b) $\vec{a} = \begin{pmatrix} \sqrt{6} + \sqrt{2} \\ \pm (\sqrt{6} - \sqrt{2}) \end{pmatrix}$

d) $\vec{a} = \begin{pmatrix} -\frac{\sqrt{6} + \sqrt{2}}{2} \\ \pm \frac{\sqrt{6} - \sqrt{2}}{2} \end{pmatrix}$

