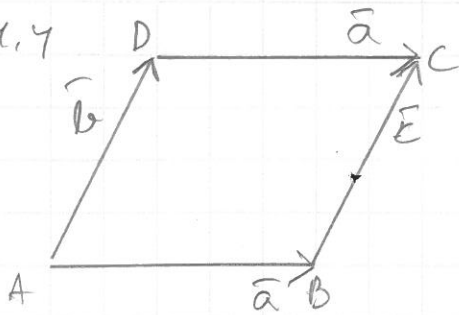


24.7

Olet. $AB \parallel DC$ ja $|AB| = |DC|$ Väite $ABCD$ on suunnikasTod. olet. $\Rightarrow \overline{AB} = \overline{DC} = \vec{a}$
mag.Kierretään $A \rightarrow D \rightarrow C \rightarrow B \rightarrow A$

$$\overline{AD} + \overline{DC} + \overline{CB} + \overline{BA} = \vec{0}$$

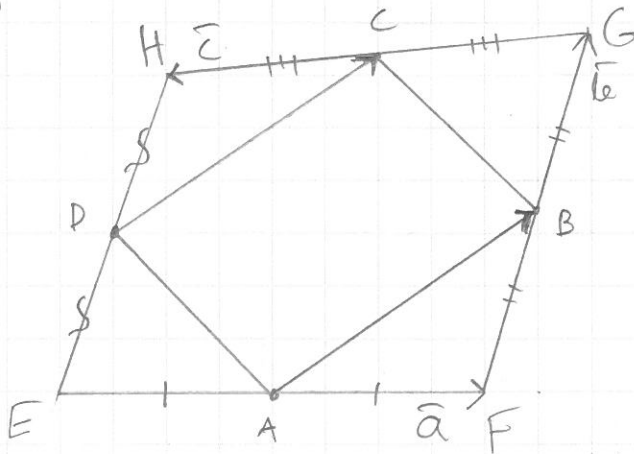
$$\Leftrightarrow \vec{b} + \vec{a} - \vec{c} - \vec{a} = \vec{0}$$

$$\Leftrightarrow \vec{b} - \vec{c} = \vec{0}$$

$$\Leftrightarrow \vec{b} = \vec{c} \quad \Rightarrow BC \parallel AD$$

 $\Rightarrow ABCD$ on suunnikas

24.10



$$\overline{EF} = \vec{a}, \quad \overline{FG} = \vec{b}, \quad \overline{GH} = \vec{c}$$

$$\overline{AB} = \overline{AF} + \overline{FB} = \frac{1}{2}\vec{a} + \frac{1}{2}\vec{b}$$

$$\overline{DC} = \overline{DH} + \overline{HC}$$

$$= \frac{1}{2}\overline{EH} - \frac{1}{2}\vec{c}$$

$$= \frac{1}{2}(\vec{a} + \vec{b} + \vec{c}) - \frac{1}{2}\vec{c}$$

$$= \frac{1}{2}\vec{a} + \frac{1}{2}\vec{b} + \frac{1}{2}\vec{c} - \frac{1}{2}\vec{c}$$

$$= \frac{1}{2}\vec{a} + \frac{1}{2}\vec{b}$$

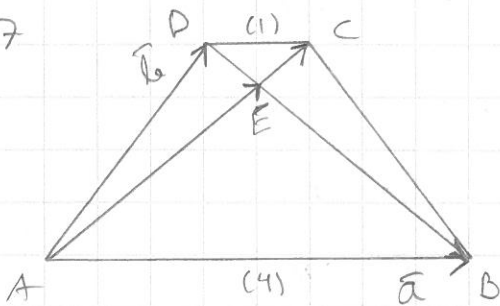
$$\Rightarrow \overline{AB} = \overline{DC} \quad \Rightarrow AB \parallel DC \text{ ja } |AB| = |DC|$$

tehl. 24.4 $\Rightarrow ABCD$ on suunnikas

$$\uparrow \text{TAI: } \overline{BC} = \frac{1}{2}\vec{b} + \frac{1}{2}\vec{c} = \overline{AD} \quad \Rightarrow AD \parallel BC \text{ ja } |AD| = |BC|$$

$$\Rightarrow ABCD \text{ on suunnikas}$$

24.7



$$\overline{AB} = \vec{a}, \quad \overline{AD} = \vec{b}$$

$$\begin{cases} \overline{AC} = \overline{AD} + \overline{DC} = \vec{b} + \frac{1}{4}\vec{a} \\ \overline{AE} = x\overline{AC} = x(\vec{b} + \frac{1}{4}\vec{a}) \end{cases}$$

$$\begin{cases} \overline{DB} = \overline{DA} + \overline{AB} = -\vec{b} + \vec{a} \\ \overline{EB} = y\overline{DB} = y(-\vec{b} + \vec{a}) \end{cases}$$

Kierretään $A \rightarrow E \rightarrow B \rightarrow A$

$$\overline{AE} + \overline{EB} + \overline{BA} = \vec{0}$$

$$\Leftrightarrow x(\vec{b} + \frac{1}{4}\vec{a}) + y(-\vec{b} + \vec{a}) - \vec{a} = \vec{0}$$

$$\Leftrightarrow x\vec{b} + \frac{1}{4}x\vec{a} - y\vec{b} + y\vec{a} - \vec{a} = \vec{0}$$

$$\Leftrightarrow (\frac{1}{4}x + y - 1)\vec{a} + (x - y)\vec{b} = \vec{0} = \underline{0} \cdot \vec{a} + \underline{0} \cdot \vec{b}$$

Sepo \vec{a} ja \vec{b}

$$\Rightarrow \begin{cases} \frac{1}{4}x + y - 1 = 0 \\ x - y = 0 \end{cases}$$