

# 問題詳解

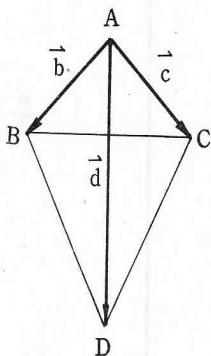
6301 (編輯部提供)

令

$$\vec{b} = \overrightarrow{AB},$$

$$\vec{d} = \overrightarrow{AD},$$

$$\vec{c} = \overrightarrow{AC}$$



已知條件

$$\overline{AB} = \overline{AD} \quad \text{即} \quad \vec{b} \cdot \vec{b} = \vec{d} \cdot \vec{d} \quad \dots\dots\dots ①$$

$$\begin{aligned} \overline{BC} &= \overline{CD} \quad \text{即} \quad (\vec{b} - \vec{c}) \cdot (\vec{b} - \vec{c}) \\ &= (\vec{d} - \vec{c}) \cdot (\vec{d} - \vec{c}) \quad \dots\dots\dots ② \end{aligned}$$

$$\begin{aligned} \text{②式可化爲} \quad & \vec{b} \cdot \vec{b} - 2\vec{b} \cdot \vec{c} + \vec{c} \cdot \vec{c} \\ &= \vec{d} \cdot \vec{d} - 2\vec{d} \cdot \vec{c} + \vec{c} \cdot \vec{c} \\ \text{即} \quad & \vec{b} \cdot \vec{b} - 2\vec{b} \cdot \vec{c} = \vec{d} \cdot \vec{d} - 2\vec{d} \cdot \vec{c} \quad \text{②} \end{aligned}$$

$$\text{由①, ②得} \quad \vec{b} \cdot \vec{c} = \vec{d} \cdot \vec{c} \quad \dots\dots\dots ③$$

(事實上, ①, ②, ③之中任兩者可推得第三者)

$$\text{③式等價於} \quad (\vec{b} - \vec{d}) \cdot \vec{c} = 0$$

$$\text{即} \quad \overline{BD} \perp \overline{AC}$$