

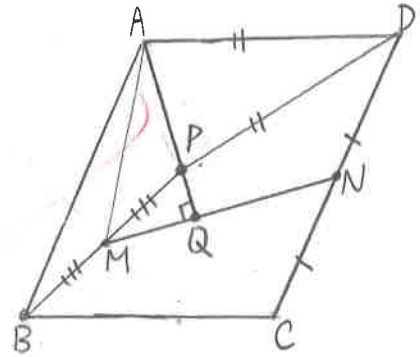
北一女中 104 學年度《數戰數決》有獎徵答活動

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題號：2-1 頁碼/總頁數： (如果只有一頁，可不填)

(請不要將兩題的解答寫在同一張答案紙，一題的解答也不要寫在同一張答案紙的正反面。)

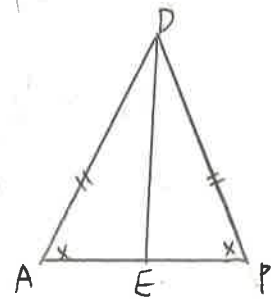
$$\begin{aligned}
 \textcircled{1} \quad \overrightarrow{MN} \cdot \overrightarrow{AP} &= (\overrightarrow{AN} - \overrightarrow{AM}) \cdot \overrightarrow{AP} \\
 &= [(\overrightarrow{AD} + \frac{1}{2}\overrightarrow{DC}) - (\frac{1}{2}\overrightarrow{AB} + \frac{1}{2}\overrightarrow{AP})] \cdot \overrightarrow{AP} \\
 &= (\overrightarrow{AD} - \frac{1}{2}\overrightarrow{AP}) \cdot \overrightarrow{AP} \\
 &= \overrightarrow{AD} \cdot \overrightarrow{AP} - \frac{1}{2}|\overrightarrow{AP}|^2
 \end{aligned}$$



$$\textcircled{2} \quad \text{又, } \overrightarrow{AD} \cdot \overrightarrow{AP} = \frac{1}{2}|\overrightarrow{AP}|^2 \quad (\triangle PAD \text{ 為等腰三角形})$$

$$\begin{aligned}
 \therefore \overrightarrow{MN} \cdot \overrightarrow{AP} &= \overrightarrow{AD} \cdot \overrightarrow{AP} - \frac{1}{2}|\overrightarrow{AP}|^2 \\
 &= \frac{1}{2}|\overrightarrow{AP}|^2 - \frac{1}{2}|\overrightarrow{AP}|^2 \\
 &= \vec{0}
 \end{aligned}$$

\Rightarrow 即 $\overrightarrow{MN} \perp \overrightarrow{PA}$ *



在一等腰三角形中

$$\overrightarrow{AD} \cdot \overrightarrow{AP} = \overrightarrow{AE} \cdot \overrightarrow{AP} = \frac{1}{2}|\overrightarrow{AP}|^2$$