VECTORS (Q 2, PAPER 2)

2006

2 (a) $\vec{x} = -3\vec{i} + \vec{j}$. Express $(\vec{x}^{\perp})^{\perp}$ in terms of $\vec{i}$ and $\vec{j}$.

2 (b) $\vec{p} = -5\vec{i} + 2\vec{j}$, $\vec{q} = \vec{i} - 6\vec{j}$ and $\vec{r} = -\vec{i} + 5\vec{j}$.

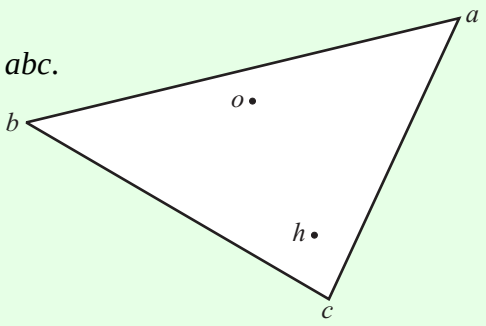
(i) Express $\overrightarrow{pq}$ and $\overrightarrow{pr}$ in terms of $\vec{i}$ and $\vec{j}$.

(ii) Given that $10\vec{s} = |\overrightarrow{pr}|\overrightarrow{pq} + |\overrightarrow{pq}|\overrightarrow{pr}$, express $\vec{s}$ in terms of $\vec{i}$ and $\vec{j}$.

(iii) Find the measure of the angle between $\vec{s}$ and $\overrightarrow{pr}$.

2 (c) The origin o is the circumcentre of the triangle abc.

If $\vec{h} = \vec{a} + \vec{b} + \vec{c}$, show that $\overrightarrow{ah} \perp \overrightarrow{bc}$.



ANSWERS

2 (a) $3\vec{i} - \vec{j}$

2 (b) (i) $\overrightarrow{pq} = 6\vec{i} - 8\vec{j}$, $\overrightarrow{pr} = 4\vec{i} + 3\vec{j}$

(ii) $\vec{s} = 7\vec{i} - \vec{j}$

(iii) 45^{o}