

VECTORS (Q 2, PAPER 2)

2004

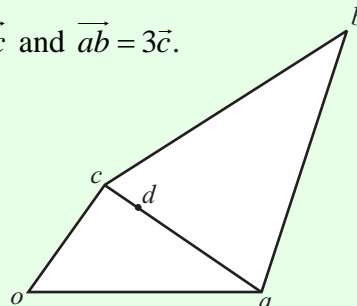
2 (a) $\vec{r} = 12\vec{i} - 35\vec{j}$. Find the unit vector in the direction of \vec{r} .

2 (b) $oabc$ is a quadrilateral, where o is the origin. $\vec{ad} = 3\vec{dc}$ and $\vec{ab} = 3\vec{c}$.

(i) Express \vec{d} in terms of \vec{a} and \vec{c} .

(ii) Express \vec{db} in terms of \vec{a} and \vec{c} .

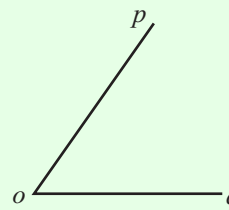
(iii) Show that o , d and b are collinear.



2 (c) p and q are points and o is the origin. p , q and o are not collinear and $|\vec{p}| = |\vec{q}|$.

(i) Prove that \vec{pq} is perpendicular to $(\vec{p} + \vec{q})$.

(ii) Prove that $\vec{po} \cdot \vec{pq} = \frac{1}{2}|\vec{pq}|^2$.



ANSWERS

2 (a) $\frac{12}{37}\vec{i} - \frac{35}{37}\vec{j}$

2 (b) (i) $\vec{d} = \frac{1}{4}\vec{a} + \frac{3}{4}\vec{c}$

(ii) $\vec{db} = \frac{3}{4}\vec{a} + \frac{9}{4}\vec{c}$