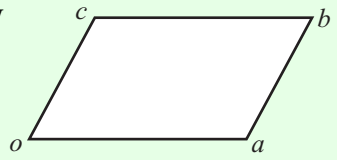
VECTORS (Q 2, PAPER 2)

LESSON NO. 1: BASIC VECTORS

2005

2 (a) Copy the parallelogram oabc in your answerbook. Show your work, construct the point *d* such that $\vec{d} = \frac{1}{2}\vec{a} + \frac{1}{2}\vec{b} - \vec{c}$, where *o* is the origin.



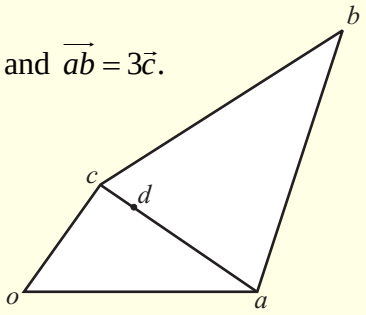
2004

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

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

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

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



2003

2 (c) *oab* is a triangle where *o* is the origin.

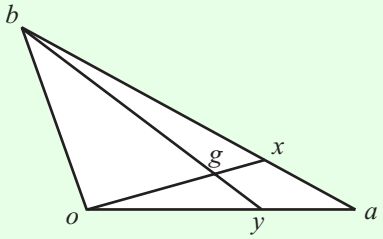
(i) *x* is a point on [*ab*] such that $|ax| : |xb| = 1:3$.

Express $\vec{x}$ in terms of $\vec{a}$ and $\vec{b}$.

(ii) *y* is a point on [*oa*] such that $|oy| : |ya| = 2:1$.

Express $\overrightarrow{by}$ in terms of $\vec{a}$ and $\vec{b}$.

(iii) [*ox*] and [*by*] intersect at *g*. Given that $\vec{g} = m\vec{x}$ and $\overrightarrow{bg} = n\overrightarrow{by}$ where $m, n \in \mathbf{R}$, find the value of *m* and the value of *n*.

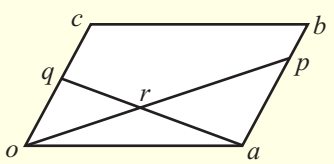


2002

2 (b) *oabc* is a parallelogram, where *o* is the origin. $p \in [ab]$ such that $|ap| : |pb| = 3:1$. *q* is the midpoint of [*oc*].

(i) Using equiangular triangles, or otherwise, find the ratio $|or| : |rp|$.

(ii) Express $\vec{p}$, and hence $\vec{r}$, in terms of $\vec{a}$ and $\vec{b}$.

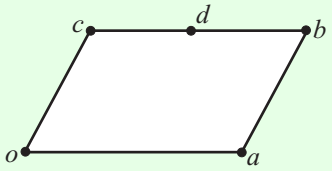


2001

2 (a) *oabc* is a parallelogram where *o* is the origin. *d* is the midpoint of [*cb*].

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

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



ANSWERS

2004 2 (b) (i) $\vec{d} = \frac{1}{4}\vec{a} + \frac{3}{4}\vec{c}$ (ii) $\overrightarrow{db} = \frac{3}{4}\vec{a} + \frac{9}{4}\vec{c}$

2003 2 (c) (i) $\vec{x} = \frac{3}{4}\vec{a} + \frac{1}{4}\vec{b}$ (ii) $\overrightarrow{by} = \frac{2}{3}\vec{a} - \vec{b}$ (iii) $n = \frac{9}{11}$, $m = \frac{8}{11}$

2002 2 (b) (i) 2:3 (ii) $\vec{p} = \frac{1}{4}\vec{a} + \frac{3}{4}\vec{b}$, $\vec{r} = \frac{1}{10}\vec{a} + \frac{3}{10}\vec{b}$

2001 2 (a) (i) $\vec{b} = \vec{a} + \vec{c}$ (ii) $\vec{d} = \frac{1}{2}\vec{a} + \vec{c}$