



SEKOLAH BUKIT SION
AY 2021-2022
ADDITIONAL MATHEMATICS 0606

CHAPTER TEST: VECTORS

NAME: _____
CLASS: _____

DATE: _____
SCORE: _____/40

Answer all questions.

Question 01

[6 marks]

(a) D is a point $(4, -1)$ and $\overrightarrow{DE} = \begin{pmatrix} -7 \\ 3 \end{pmatrix}$.
Find the coordinates of the point E .

(b) $\mathbf{v} = \begin{pmatrix} 12 \\ t \end{pmatrix}$ and $|\mathbf{v}| = 13$
Find the value of t , where $t < 0$.

(c) A vector \mathbf{v} has a magnitude of 102 units and has an opposite direction as $\begin{pmatrix} 8 \\ -15 \end{pmatrix}$.
Find \mathbf{v} in column vector form.

Question 02**[6 marks]**

Vector $\mathbf{c} = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$ and $\mathbf{d} = \begin{pmatrix} 5p + q \\ p - q \end{pmatrix}$ are such that $\mathbf{c} + 2\mathbf{d} = \begin{pmatrix} 27 \\ p^2 \end{pmatrix}$.

Find the possible values of p and q .

Question 03**[4 marks]**

P and Q are points such that their position vectors are \mathbf{p} and \mathbf{q} , respectively.

The point R lies on PQ such that $PR = 4RQ$.

Find the position vector of R in terms of \mathbf{p} and \mathbf{q} , in simplest form.

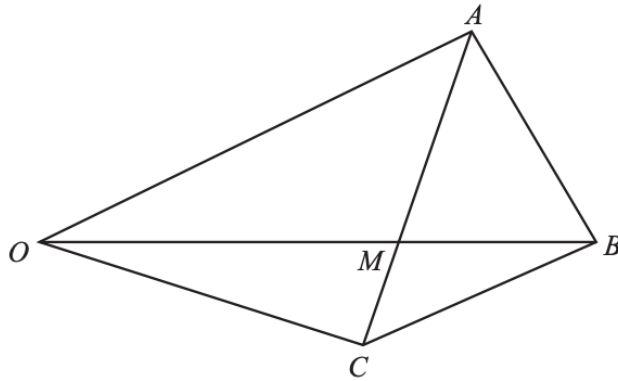
Question 04**[6 marks]**

Relative to the origin O , the position vectors of A and B are $2\mathbf{i} - 3\mathbf{j}$ and $11\mathbf{i} + 42\mathbf{j}$, respectively.

(a) Write down an expression for \overrightarrow{AB} .

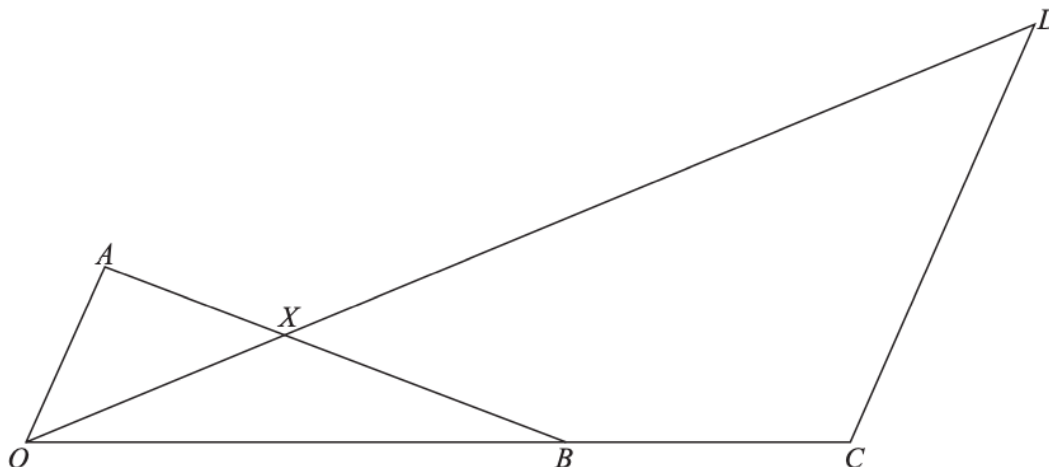
(b) The point C lies on AB such that $\overrightarrow{AC} = \frac{1}{3}\overrightarrow{AB}$.

Find the unit vector of \overrightarrow{OC} , in terms of \mathbf{i} and \mathbf{j} .



The diagram shows the quadrilateral $OABC$ such that $\overrightarrow{OA} = \mathbf{a}$, $\overrightarrow{OB} = \mathbf{b}$ and $\overrightarrow{OC} = \mathbf{c}$. It is given that $AM : MC = 3 : 1$ and $OM : MB = 4 : 3$.

- (a) Find \overrightarrow{AC} in terms of \mathbf{a} and \mathbf{c} .
- (b) Find \overrightarrow{OM} in terms of \mathbf{a} and \mathbf{c} .
- (c) Find \overrightarrow{OM} in terms of \mathbf{b} .
Hence, show that $7\mathbf{a} + 21\mathbf{c} = 16\mathbf{b}$
- (d) Find \overrightarrow{AB} in terms of \mathbf{a} and \mathbf{c} , giving your answer in simplest form.



The diagram shows points O, A, B, C, D and X . The position vectors of A, B and C relative to O are $\overrightarrow{OA} = \mathbf{a}$, $\overrightarrow{OB} = \mathbf{b}$ and $\overrightarrow{OC} = \frac{3}{2}\mathbf{b}$.

It is also given that $\overrightarrow{CD} = 3\mathbf{a}$.

(a) If $\overrightarrow{OX} = \lambda\overrightarrow{OD}$, express \overrightarrow{OX} in terms of λ , \mathbf{a} and \mathbf{b} .

(b) If $\overrightarrow{AX} = \mu\overrightarrow{AB}$, express \overrightarrow{OX} in terms of μ , \mathbf{a} and \mathbf{b} .

(c) Use your two expressions for \overrightarrow{OX} to find the value of λ and μ .

(d) Find the ratio $\frac{\text{Area } \Delta AXO}{\text{Area } \Delta XBO}$.

(e) If Y is a point on OD such that BY is parallel to CD .

(i) Find \overrightarrow{BY} .

(ii) Find the ratio $\frac{\text{Area } \Delta OBY}{\text{Area } \Delta OCD}$.