

Name: _____

GCSE Unit 18 Practice Assessment

Date: _____

Time: 55 minutes

Total marks available: 47

Total marks achieved: _____

Questions

Q1.

*

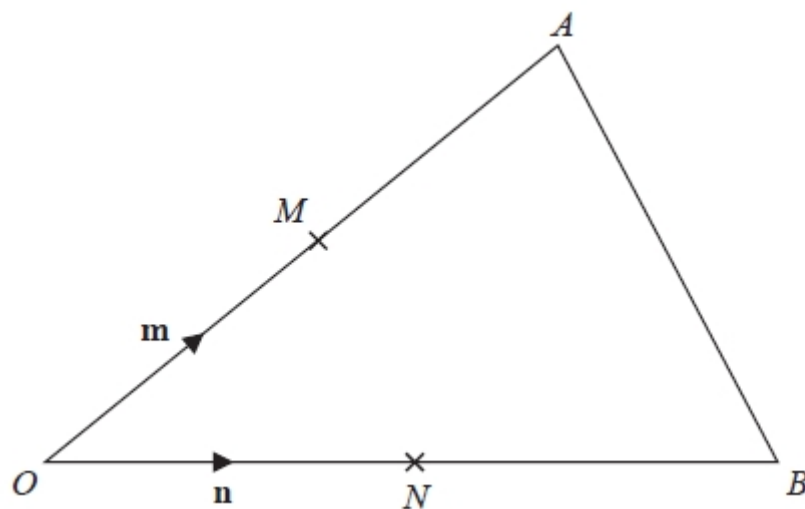


Diagram **NOT**
accurately drawn

OAB is a triangle.

M is the midpoint of OA .

N is the midpoint of OB .

$$\vec{OM} = \mathbf{m}$$

$$\vec{ON} = \mathbf{n}$$

Show that AB is parallel to MN .

(Total for Question is 3 marks)

Q2.

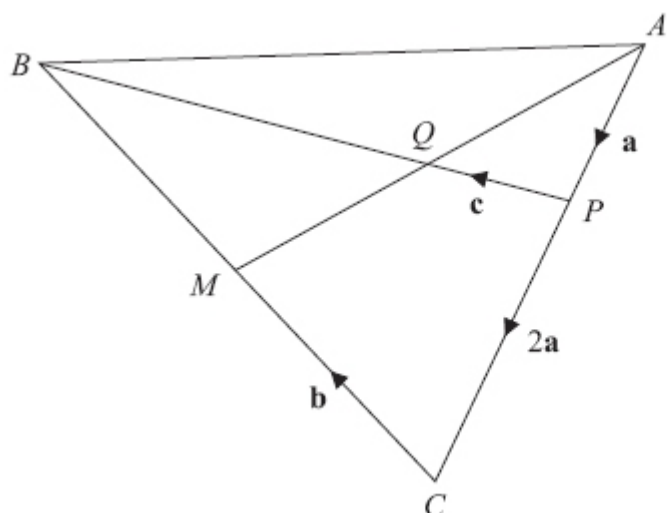


Diagram **NOT**
accurately drawn

M is the midpoint of BC .
 Q is the midpoint of AM .

$$\overrightarrow{AP} = \mathbf{a} \quad \overrightarrow{PC} = 2\mathbf{a} \quad \overrightarrow{CM} = \mathbf{b} \quad \overrightarrow{PQ} = \mathbf{c}$$

(a) Find $\overrightarrow{AM}$ in terms of $\mathbf{a}$ and $\mathbf{b}$.

$$\overrightarrow{AM} = \dots\dots\dots (1)$$

(b) Find $\overrightarrow{QB}$ in terms of $\mathbf{c}$.

$$\overrightarrow{QB} = \dots\dots\dots (4)$$

(Total for Question is 5 marks)

Q3.

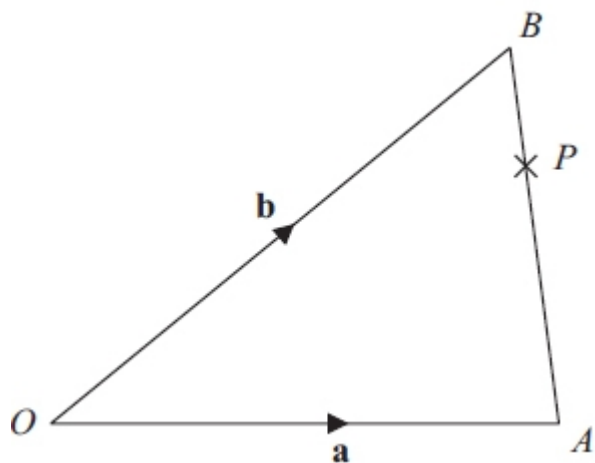


Diagram **NOT** accurately drawn

OAB is a triangle.

$$\begin{aligned}\vec{OA} &= \mathbf{a} \\ \vec{OB} &= \mathbf{b}\end{aligned}$$

(a) Find $\vec{AB}$ in terms of $\mathbf{a}$ and $\mathbf{b}$.

.....
(1)

P is the point on AB such that $AP : PB = 3 : 1$

(b) Find $\vec{OP}$ in terms of $\mathbf{a}$ and $\mathbf{b}$. Give your answer in its simplest form.

.....
(3)

(Total for Question is 4 marks)

Q4.

The diagram shows a regular hexagon $OABCDE$.

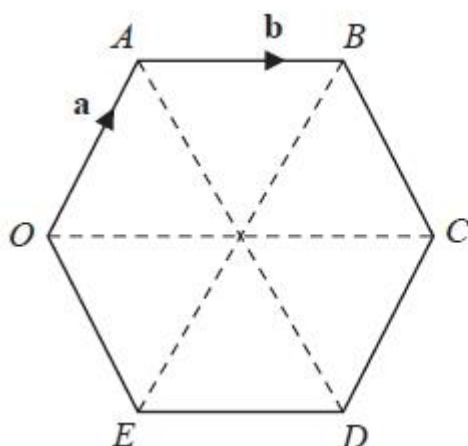


Diagram **NOT**
accurately drawn

$$\vec{OA} = \mathbf{a}$$

$$\vec{AB} = \mathbf{b}$$

M is the midpoint of OE .

N is the midpoint of AB .

(a) Find $\vec{MN}$ in terms of $\mathbf{a}$ and/or $\mathbf{b}$.

$$\vec{MN} = \dots\dots\dots$$

(3)

(b) Describe fully what your answer to part (a) shows about the lines OA and MN .

.....

.....

(2)

(Total for question = 5 marks)

Q5.

OAB is a triangle.

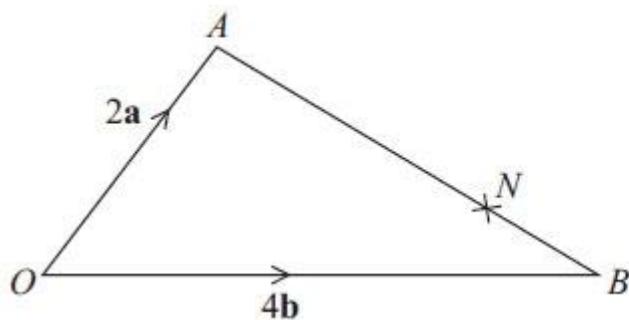


Diagram **NOT**
accurately drawn

N is the point on AB such that $AN : NB = 3 : 1$

$$\vec{OA} = 2\mathbf{a}$$

$$\vec{OB} = 4\mathbf{b}$$

(a) Find $\vec{AB}$ in terms of $\mathbf{a}$ and $\mathbf{b}$.

.....
(1)

(b) Find $\vec{ON}$ in terms of $\mathbf{a}$ and $\mathbf{b}$.
Give your vector in its simplest form.

.....
(3)

(Total for Question is 4 marks)

Q6.

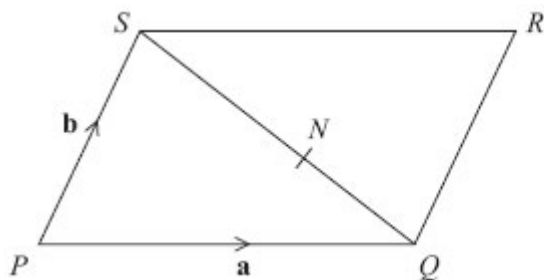


Diagram **NOT**
accurately drawn

$PQRS$ is a parallelogram.

N is the point on SQ such that $SN : NQ = 3 : 2$

$$\vec{PQ} = \mathbf{a}$$

$$\vec{PS} = \mathbf{b}$$

(a) Write down, in terms of $\mathbf{a}$ and $\mathbf{b}$, an expression for $\vec{SQ}$.

$$\vec{SQ} = \dots\dots\dots (1)$$

(b) Express $\vec{NR}$ in terms of $\mathbf{a}$ and $\mathbf{b}$.

$$\vec{NR} = \dots\dots\dots (3)$$

(Total for Question is 4 marks)

Q7.

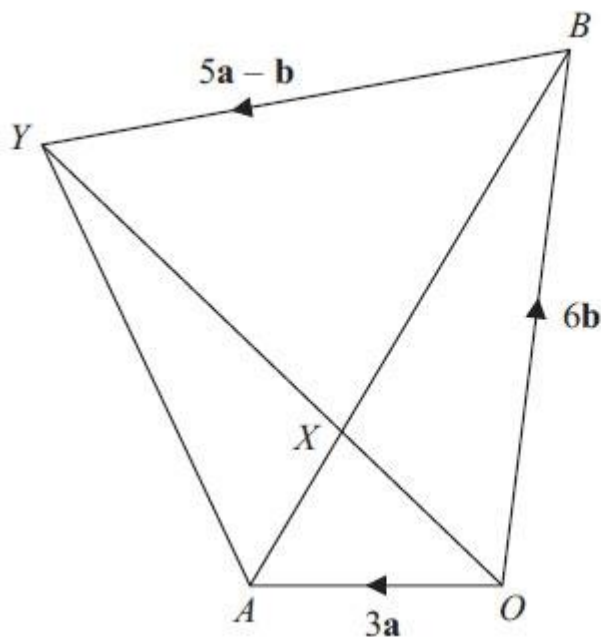


Diagram **NOT**
accurately drawn

OAYB is a quadrilateral.

$$\vec{OA} = 3\mathbf{a}$$

$$\vec{OB} = 6\mathbf{b}$$

(a) Express $\vec{AB}$ in terms of $\mathbf{a}$ and $\mathbf{b}$.

(1)

X is the point on AB such that $AX : XB = 1 : 2$

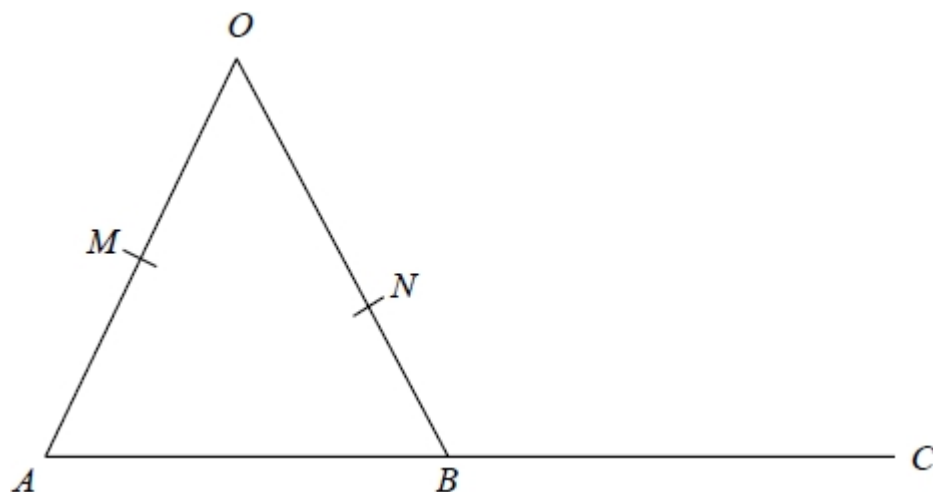
and $\vec{BY} = 5\mathbf{a} - \mathbf{b}$

* (b) Prove that $\vec{OX} = \frac{2}{5}\vec{OY}$

(4)

(Total for Question is 5 marks)

Q8.



OMA , ONB and ABC are straight lines.

M is the midpoint of OA .

B is the midpoint of AC .

$\vec{OA} = 6\mathbf{a}$ $\vec{OB} = 6\mathbf{b}$ $\vec{ON} = k\mathbf{b}$ where k is a scalar quantity.

Given that MNC is a straight line, find the value of k .

(Total for question = 5 marks)

Q9.

$OACB$ is a parallelogram.

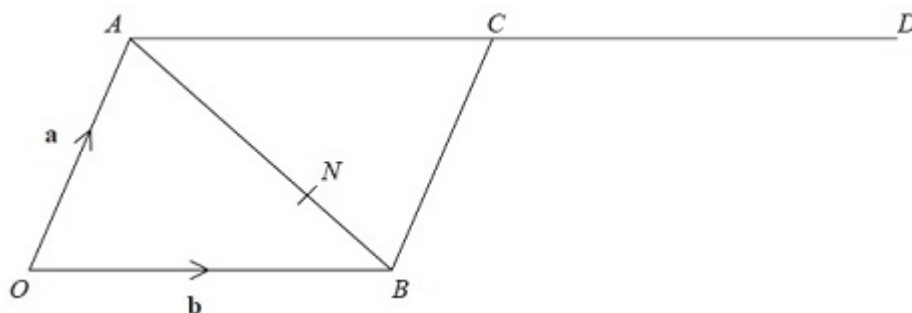


Diagram **NOT**
accurately drawn

$$\vec{OA} = \mathbf{a} \text{ and } \vec{OB} = \mathbf{b}$$

D is the point such that $\vec{AC} = \vec{CD}$

The point N divides AB in the ratio $2:1$

(a) Write an expression for $\vec{ON}$ in terms of $\mathbf{a}$ and $\mathbf{b}$.

(3)

*(b) Prove that OND is a straight line.

(3)

(Total for Question is 6 marks)

Q10.

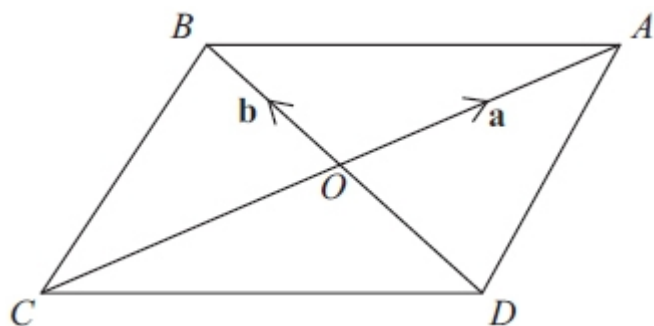


Diagram **NOT** accurately drawn

$ABCD$ is a parallelogram.

The diagonals of the parallelogram intersect at O .

$$\vec{OA} = \mathbf{a} \text{ and } \vec{OB} = \mathbf{b}$$

(a) Write an expression, in terms of $\mathbf{a}$ and/or $\mathbf{b}$, for

(i) $\vec{CA}$,

.....

(ii) $\vec{BA}$,

.....

(ii) $\vec{BC}$.

.....

(3)

X is the point such that $\vec{OX} = 2\mathbf{a} - \mathbf{b}$

(b) (i) Find an expression, in terms of $\mathbf{a}$ and $\mathbf{b}$, for $\vec{AX}$.

.....

(ii) B , A and X lie on the same straight line.

Explain why.

.....

.....

.....

(3)

(Total for Question is 6 marks)