



EXAM PAPERS PRACTICE

GCSE OCR Math J560
Vectors

Question Paper

*"We will help you to
achieve A Star "*



Question 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 marks]

Question 2

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

[3 marks]

Question 3

- (b) Work out $\mathbf{a} + 2\mathbf{b}$ as a column vector.

[2 marks]



Question 4

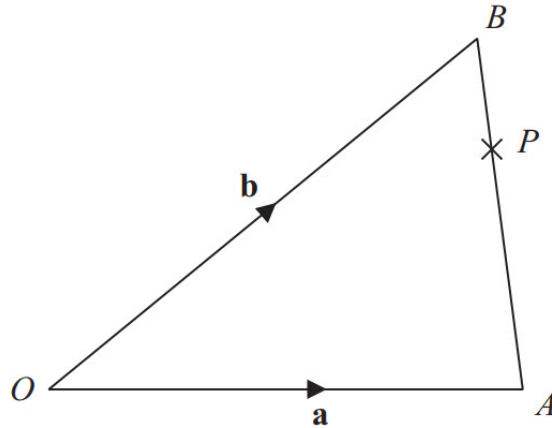


Diagram **NOT**
accurately drawn

OAB is a triangle.

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

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

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

[1 mark]



Question 5

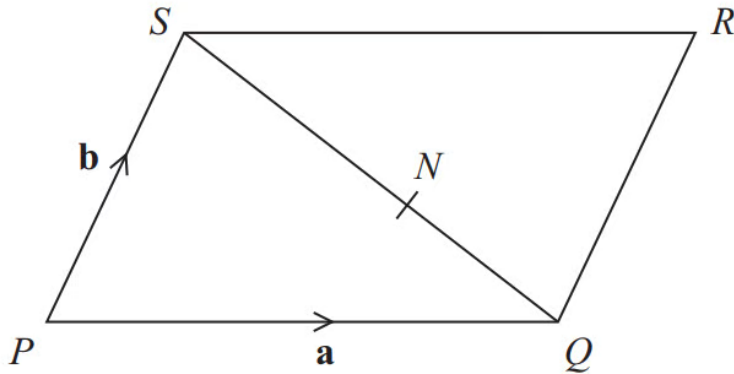


Diagram **NOT**
accurately drawn

$PQRS$ 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} .

[1 mark]



Question 6

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 marks]

Question 7

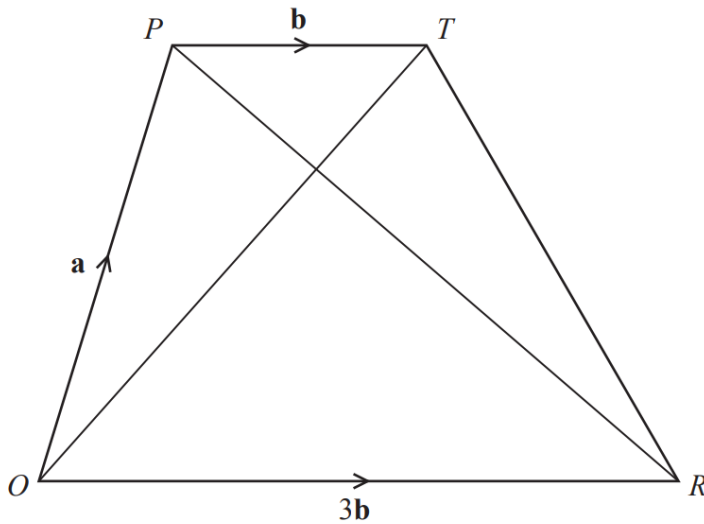


Diagram **NOT** accurately drawn

$OPTR$ is a trapezium.

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

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

$$\vec{OR} = 3\mathbf{b}$$

(a) (i) Find \vec{OT} in terms of \mathbf{a} and \mathbf{b}

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

[2 marks]



Question 8

*(c) What does your answer to part (b) tell you about the position of point S ?

[2 marks]

Question 9

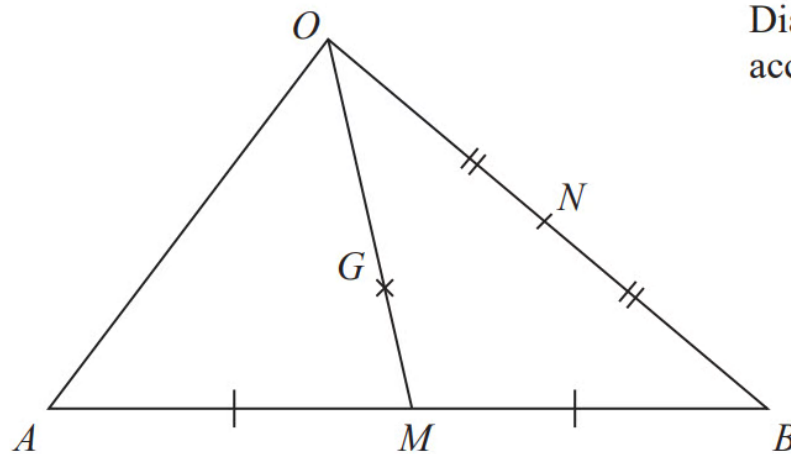


Diagram **NOT**
accurately drawn

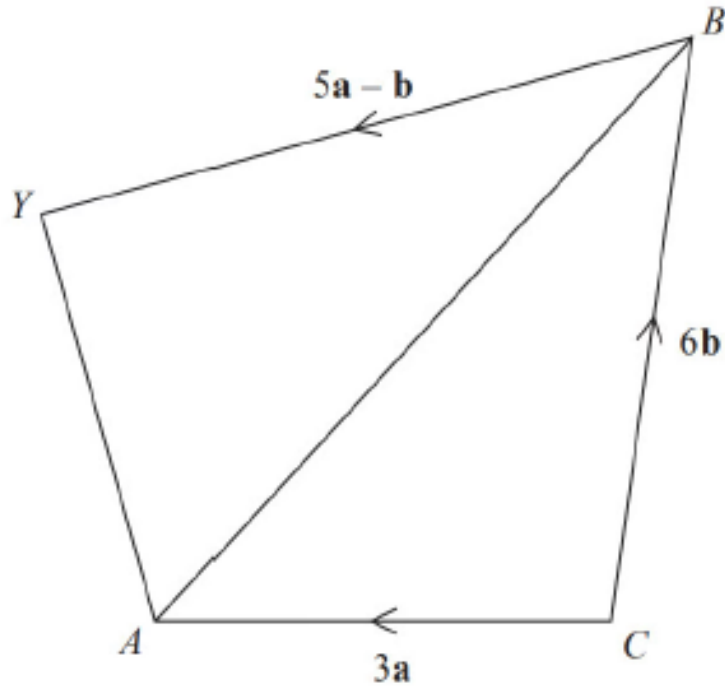
$\vec{OA} = 6\mathbf{a}$ and $\vec{OB} = 6\mathbf{b}$
 M is the midpoint of AB .

- (a) Write \vec{OM} in terms of \mathbf{a} and \mathbf{b} .
Give your answer in its simplest form.

[2 marks]



Question 10



$CAYB$ is a quadrilateral.

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

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

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

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

Prove that $\vec{CX} = \frac{2}{5}\vec{CY}$

[5 marks]



Question 11

B is the midpoint of AC .

M is the midpoint of PB .

*(b) Show that NMC is a straight line.

[4 marks]

Question 12

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

[3 marks]



Question 13

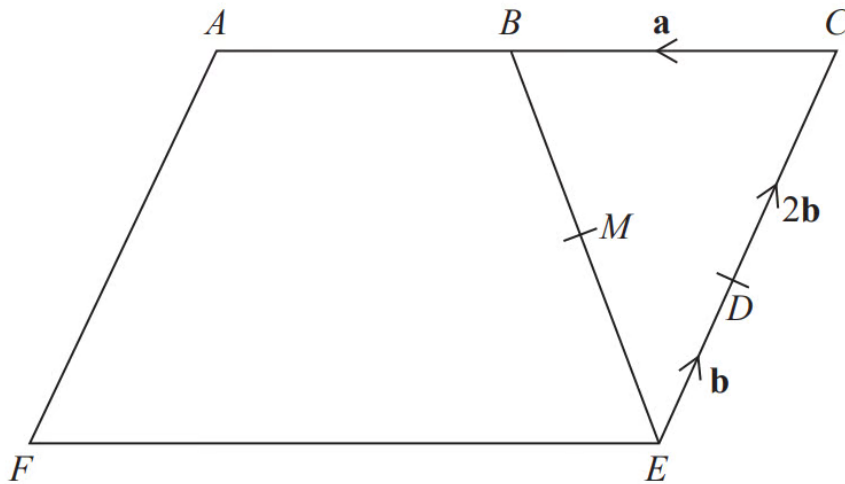


Diagram **NOT**
accurately drawn

$ACEF$ is a parallelogram.
 B is the midpoint of AC .
 M is the midpoint of BE .

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

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

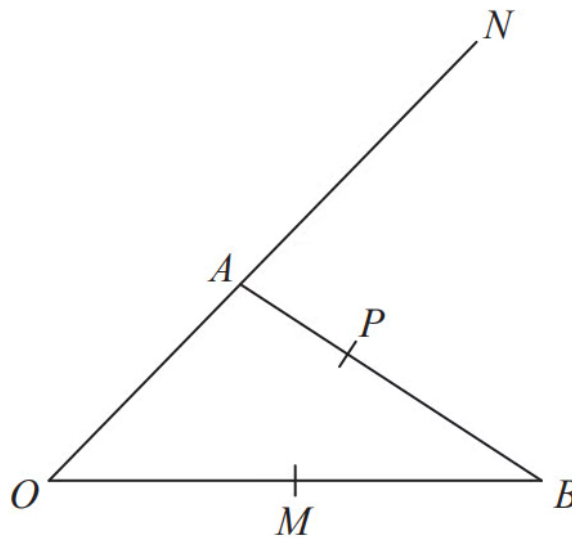
$$\vec{DC} = 2\mathbf{b}$$

Show that AMD is a straight line.

[5 marks]



Question 14



OAN , OMB and APB are straight lines.

$AN = 2OA$.

M is the midpoint of OB .

$$\vec{OA} = \mathbf{a} \quad \vec{OB} = \mathbf{b}$$

$\vec{AP} = k\vec{AB}$ where k is a scalar quantity.

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

[5 marks]



Question 15

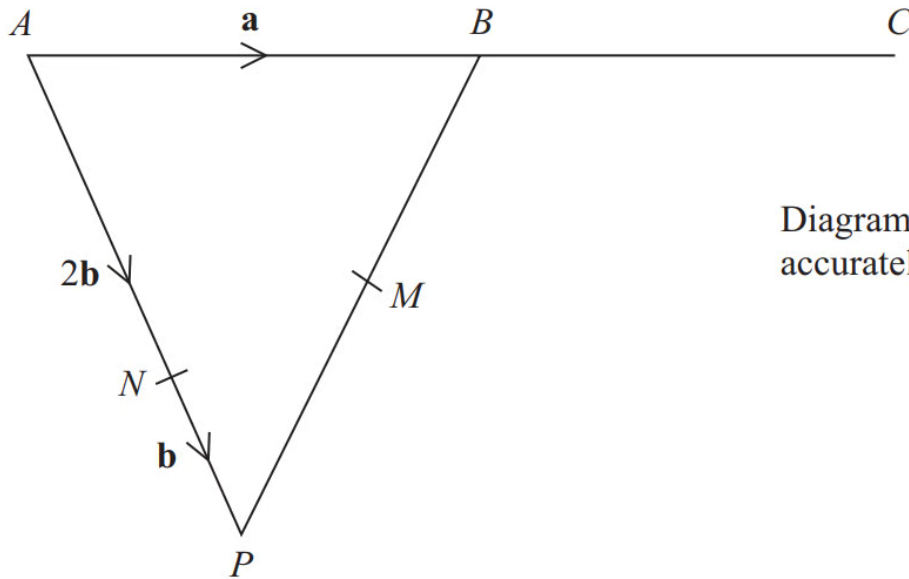


Diagram **NOT**
accurately drawn

APB is a triangle.
 N is a point on AP .

$$\vec{AB} = \mathbf{a} \quad \vec{AN} = 2\mathbf{b} \quad \vec{NP} = \mathbf{b}$$

(a) Find the vector \vec{PB} , in terms of \mathbf{a} and \mathbf{b} .

[1 mark]