

Vectors

Difficulty: Easy

Question Paper 2

Level	IGCSE
Subject	Maths (0580/0980)
Exam Board	CIE
Topic	Vectors and transformations
Sub-Topic	Vectors
Paper	Paper 2
Difficulty	Easy
Booklet	Question Paper 2

Time allowed: 37 minutes

Score: /29

Percentage: /100

Grade Boundaries:

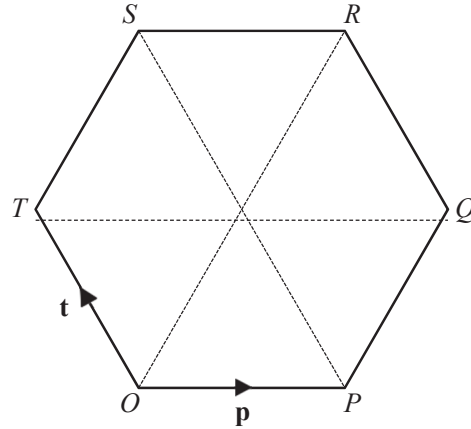
CIE IGCSE Maths (0580)

A*	A	B	C	D	E
>88%	76%	63%	51%	40%	30%

CIE IGCSE Maths (0980)

9	8	7	6	5	4	3
>94%	85%	77%	67%	57%	47%	35%

Question 1



O is the origin and $OPQRST$ is a regular hexagon.

$$\vec{OP} = \mathbf{p} \text{ and } \vec{OT} = \mathbf{t}.$$

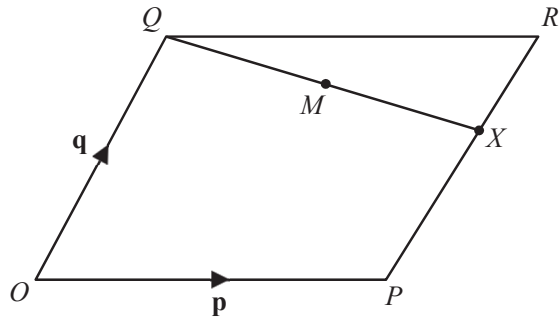
Find, in terms of \mathbf{p} and \mathbf{t} , in their simplest forms,

(a) \vec{PT} , [1]

(b) \vec{PR} , [2]

(c) the position vector of R . [2]

Question 2



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O is the origin and $OPRQ$ is a parallelogram.
The position vectors of P and Q are \mathbf{p} and \mathbf{q} .
 X is on PR so that $PX = 2XR$.

Find, in terms of \mathbf{p} and \mathbf{q} , in their simplest forms

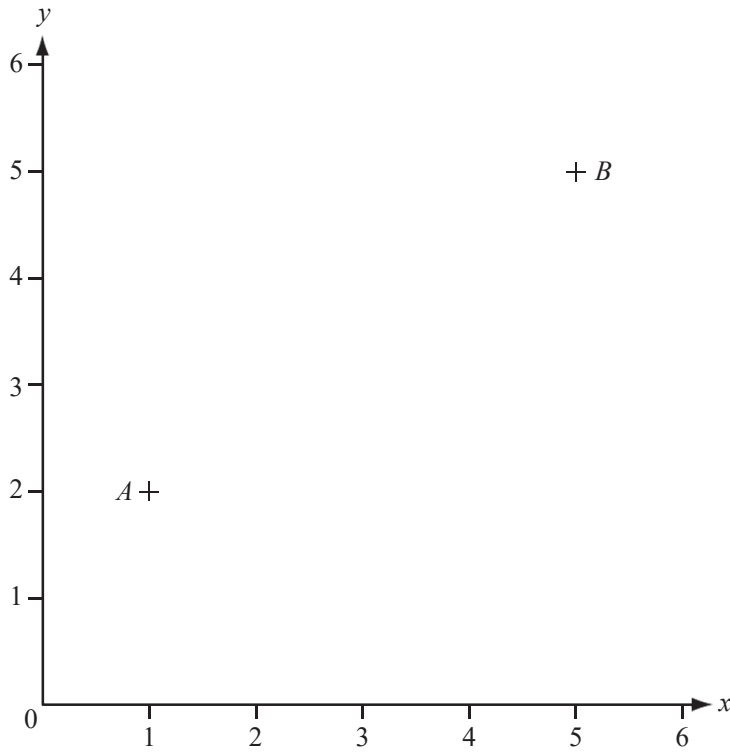
(a) \vec{QX}

[2]

(b) the position vector of M , the midpoint of QX .

[2]

Question 3

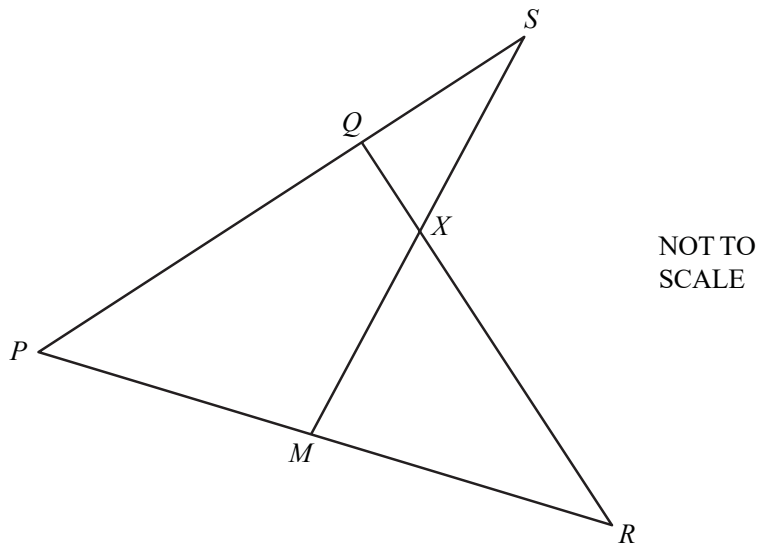


The points $A(1, 2)$ and $B(5, 5)$ are shown on the diagram .

(a) Work out the co-ordinates of the midpoint of AB . [1]

(b) Write down the column vector \vec{AB} . [1]

Question 4



In the diagram, PQS , PMR , MXS and QXR are straight lines.

$$PQ = 2 QS.$$

M is the midpoint of PR .

$$QX : XR = 1 : 3.$$

$$\vec{PQ} = \mathbf{q} \text{ and } \vec{PR} = \mathbf{r}.$$

(a) Find, in terms of \mathbf{q} and \mathbf{r} ,

(i) \vec{RQ} , [1]

(ii) \vec{MS} . [1]

(b) By finding \vec{MX} , show that X is the midpoint of MS . [3]

Question 5

The position vector \mathbf{r} is given by $\mathbf{r} = 2\mathbf{p} + t(\mathbf{p} + \mathbf{q})$.

- (a) Complete the table below for the given values of t .
Write each vector in its simplest form.
One result has been done for you.

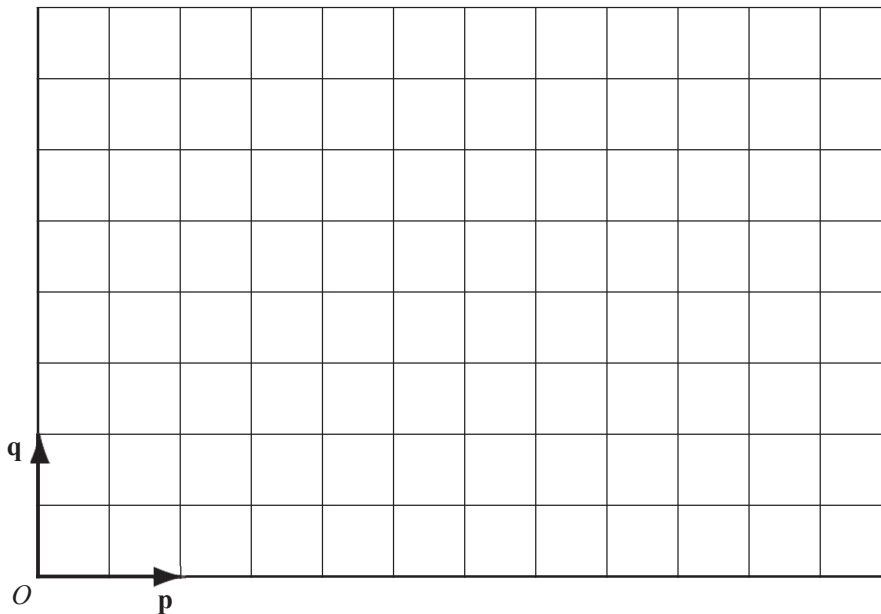
[3]

t	0	1	2	3
\mathbf{r}			$4\mathbf{p} + 2\mathbf{q}$	

- (b) O is the origin and \mathbf{p} and \mathbf{q} are shown on the diagram.

- (i) Plot the 4 points given by the position vectors in the table.

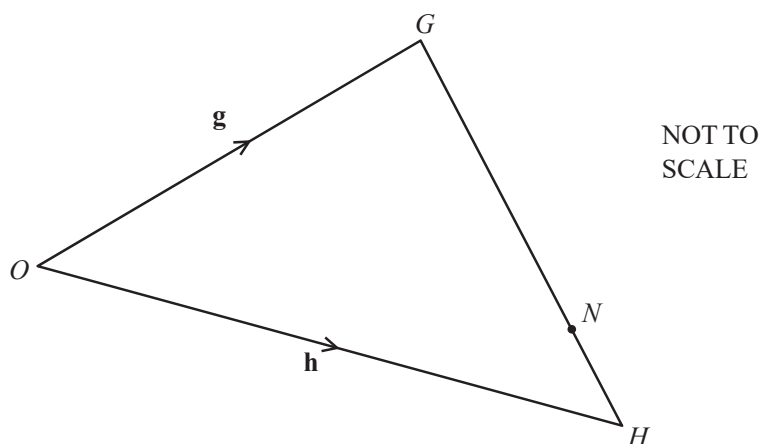
[2]



- (ii) What can you say about these four points?

[1]

Question 6



In triangle OGH , the ratio $GN : NH = 3 : 1$.

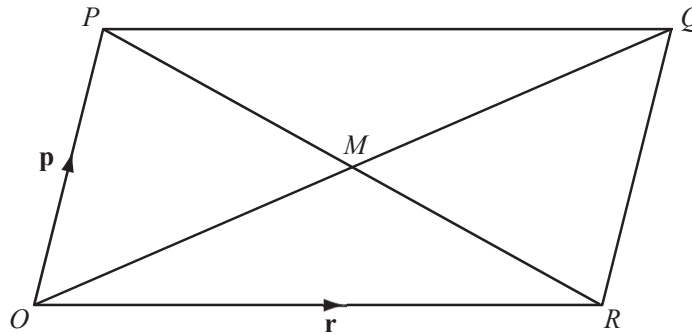
$$\vec{OG} = \mathbf{g} \text{ and } \vec{OH} = \mathbf{h}.$$

Find the following in terms of \mathbf{g} and \mathbf{h} , giving your answers in their simplest form.

(a) \vec{HG} [1]

(b) \vec{ON} [2]

Question 7



O is the origin and $OPQR$ is a parallelogram whose diagonals intersect at M .

The vector \vec{OP} is represented by \mathbf{p} and the vector \vec{OR} is represented by \mathbf{r} .

(a) Write down a single vector which is represented by

(i) $\mathbf{p} + \mathbf{r}$, [1]

(ii) $\frac{1}{2}\mathbf{p} - \frac{1}{2}\mathbf{r}$. [1]

(b) On the diagram, mark with a cross (\times) and label with the letter S the point with position vector

[2]

$$\frac{1}{2}\mathbf{p} + \frac{3}{4}\mathbf{r}.$$