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## National 5 Maths Vector Pathways

SQA past paper and specimen paper  
questions and answers by topic

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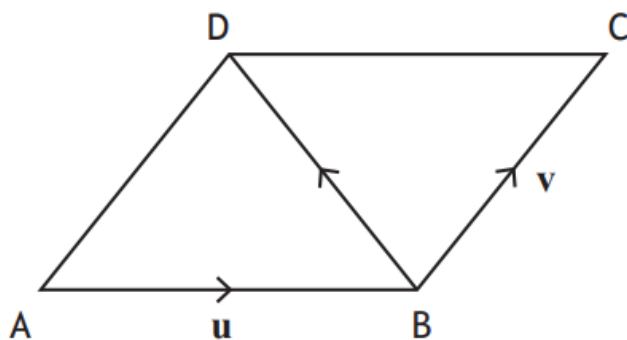
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The diagram below shows parallelogram ABCD.



$\vec{AB}$  represents vector  $\mathbf{u}$  and  $\vec{BC}$  represents vector  $\mathbf{v}$ .

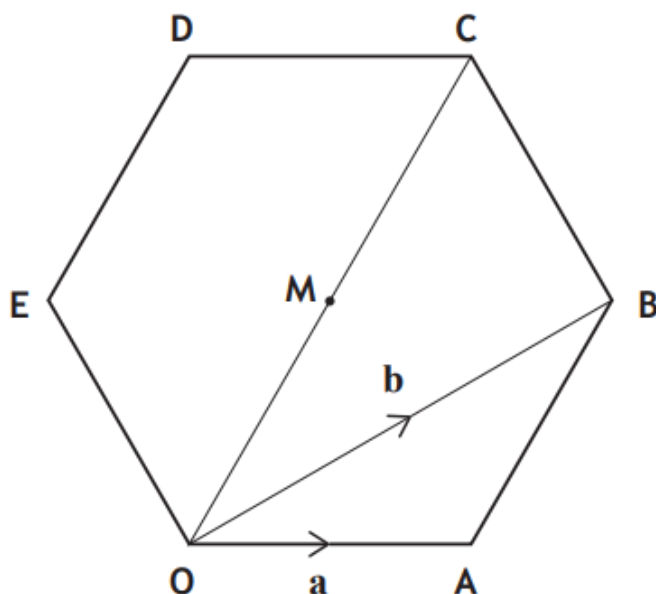
Express  $\vec{BD}$  in terms of  $\mathbf{u}$  and  $\mathbf{v}$ .

1

Answer:

$\vec{v} - \vec{u}$

In the diagram, OABCDE is a regular hexagon with centre M.  
Vectors  $\mathbf{a}$  and  $\mathbf{b}$  are represented by  $\overrightarrow{OA}$  and  $\overrightarrow{OB}$  respectively.



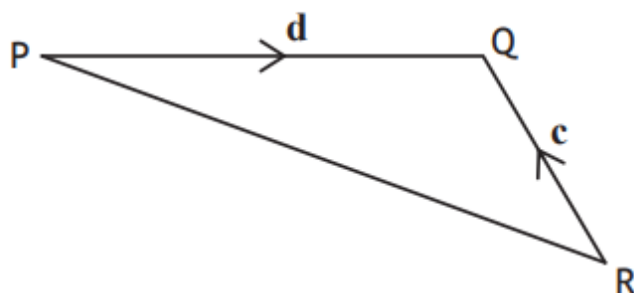
- (a) Express  $\overrightarrow{AB}$  in terms of  $\mathbf{a}$  and  $\mathbf{b}$ . 1
- (b) Express  $\overrightarrow{OC}$  in terms of  $\mathbf{a}$  and  $\mathbf{b}$ . 1

Answers:

- (a)  $\underline{\mathbf{b}} - \underline{\mathbf{a}}$  (or equivalent)
- (b)  $2(\underline{\mathbf{b}} - \underline{\mathbf{a}})$  or  $2\underline{\mathbf{b}} - 2\underline{\mathbf{a}}$  (or equivalent)



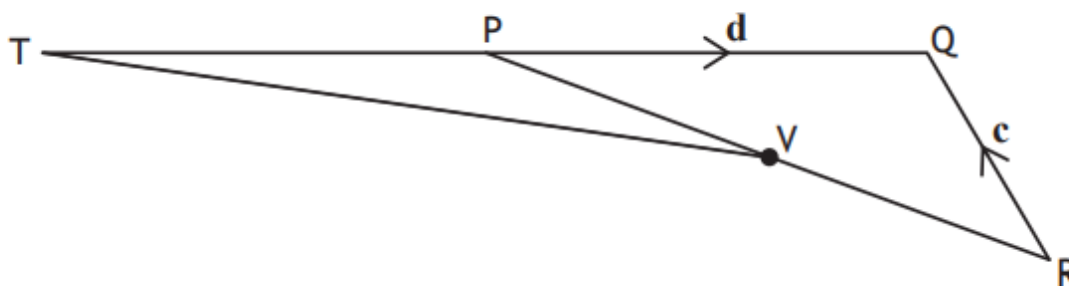
In the diagram below,  $\vec{RQ}$  and  $\vec{PQ}$  represent the vectors  $\mathbf{c}$  and  $\mathbf{d}$  respectively.



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

1

The line QP is extended to T.



- $TP = PQ$
- $V$  is the midpoint of  $PR$

(b) Express  $\vec{TV}$  in terms of  $\mathbf{c}$  and  $\mathbf{d}$ .

Give your answer in simplest form.

2

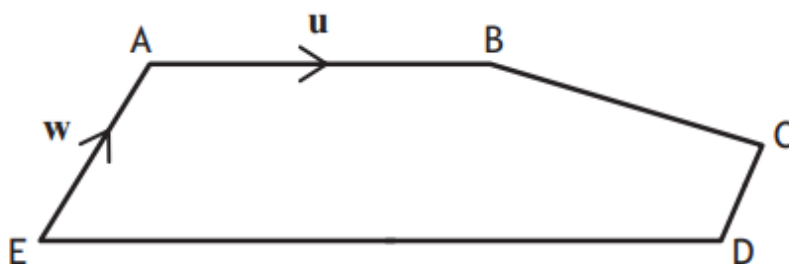
Answers:

(a)  $\underline{\mathbf{d}} - \underline{\mathbf{c}}$  (or equivalent)

(b)  $\frac{3}{2}\underline{\mathbf{d}} - \frac{1}{2}\underline{\mathbf{c}}$  (or equivalent)



In the diagram below,  $\vec{AB}$  and  $\vec{EA}$  represent the vectors  $\mathbf{u}$  and  $\mathbf{w}$  respectively.



- $\vec{ED} = 2\vec{AB}$
- $\vec{EA} = 2\vec{DC}$

Express  $\vec{BC}$  in terms of  $\mathbf{u}$  and  $\mathbf{w}$ .

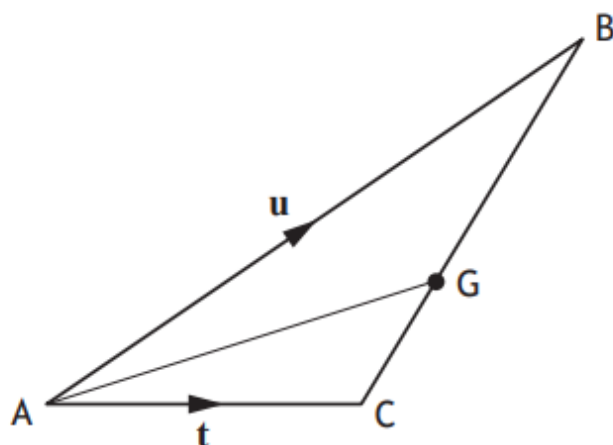
Give your answer in its simplest form.

2

Answer:

$$\underline{\mathbf{u}} - \frac{1}{2} \underline{\mathbf{w}}$$

The triangle ABC is shown below



$$\vec{AB} = \mathbf{u} \text{ and } \vec{AC} = \mathbf{t}.$$

G is the point such that  $CG = \frac{1}{3}CB$ .

Express  $\vec{AG}$  in terms of  $\mathbf{u}$  and  $\mathbf{t}$ .

Give your answer in simplest form.

3

Answer:

$$\frac{2}{3}\mathbf{t} + \frac{1}{3}\mathbf{u} \text{ (or equivalent)}$$