



## National 5 Mathematics

### Vectors - Questions

Marks are indicated in brackets after each question number

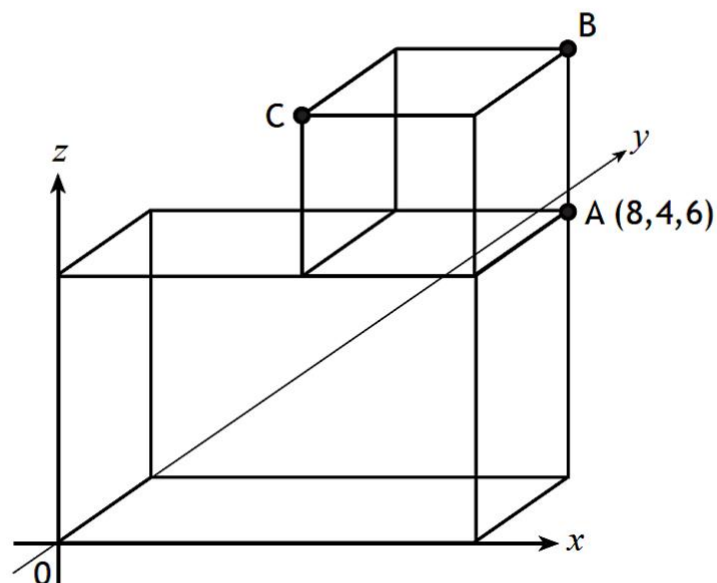
#### 2014 Paper 1 Question 4, (2)

Find the resultant vector  $2\mathbf{u} - \mathbf{v}$  when  $\mathbf{u} = \begin{pmatrix} -2 \\ 3 \\ 5 \end{pmatrix}$  and  $\mathbf{v} = \begin{pmatrix} 0 \\ -4 \\ 7 \end{pmatrix}$ .

Express your answer in component form.

#### 2014 Paper 2 Question 2, (2)

The diagram shows a cube placed on top of a cuboid, relative to the coordinate axes.



A is the point (8,4,6).

Write down the coordinates of B and C.



### 2015 Paper 2 Question 4, (2)

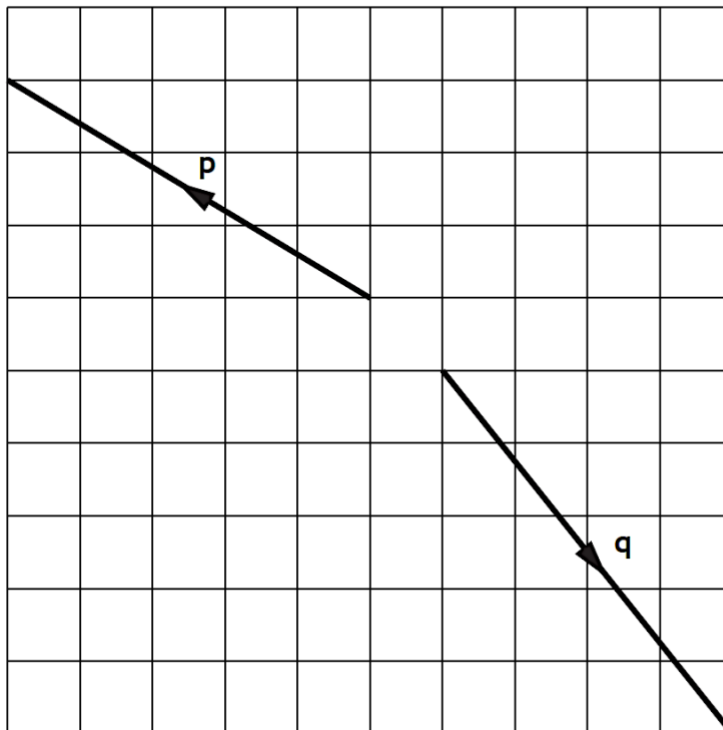
Find  $|\mathbf{u}|$ , the magnitude of vector  $\mathbf{u} = \begin{pmatrix} 6 \\ -13 \\ 18 \end{pmatrix}$ .

### 2015 Paper 2 Question 5, (2)

The vectors  $\mathbf{p}$  and  $\mathbf{q}$  are shown in the diagram below.

Find the resultant vector  $\mathbf{p} + \mathbf{q}$ .

Express your answer in component form.



### 2016 Paper 1 Question 1, (2)

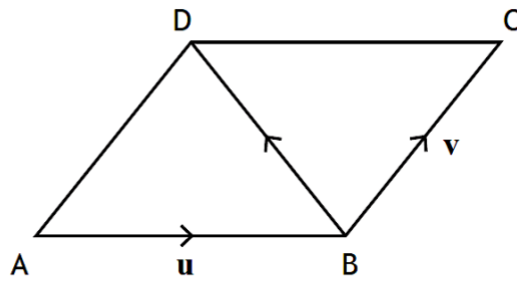
Given  $\mathbf{p} = \begin{pmatrix} 4 \\ -6 \end{pmatrix}$  and  $\mathbf{q} = \begin{pmatrix} -5 \\ -1 \end{pmatrix}$ .

Find the resultant vector  $\frac{1}{2}\mathbf{p} + \mathbf{q}$ .

Express your answer in component form.



### 2016 Paper 2 Question 3, (1)

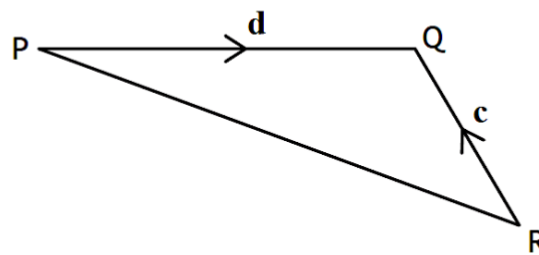


$\vec{AB}$  represents vector  $\mathbf{u}$  and  $\vec{BC}$  represents vector  $\mathbf{v}$ .

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

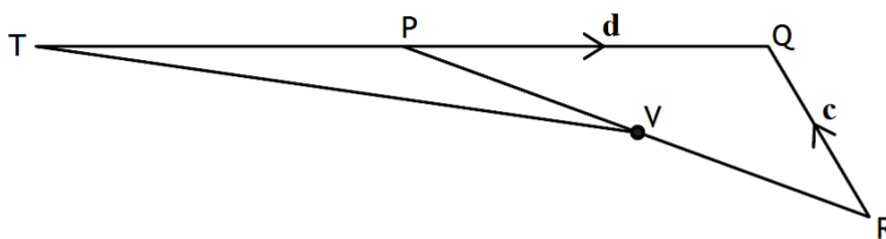
### 2017 Paper 2 Question 8, (1) (2)

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  $\mathbf{d}$ .

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.



### 2018 Paper 1 Question 4, (2)

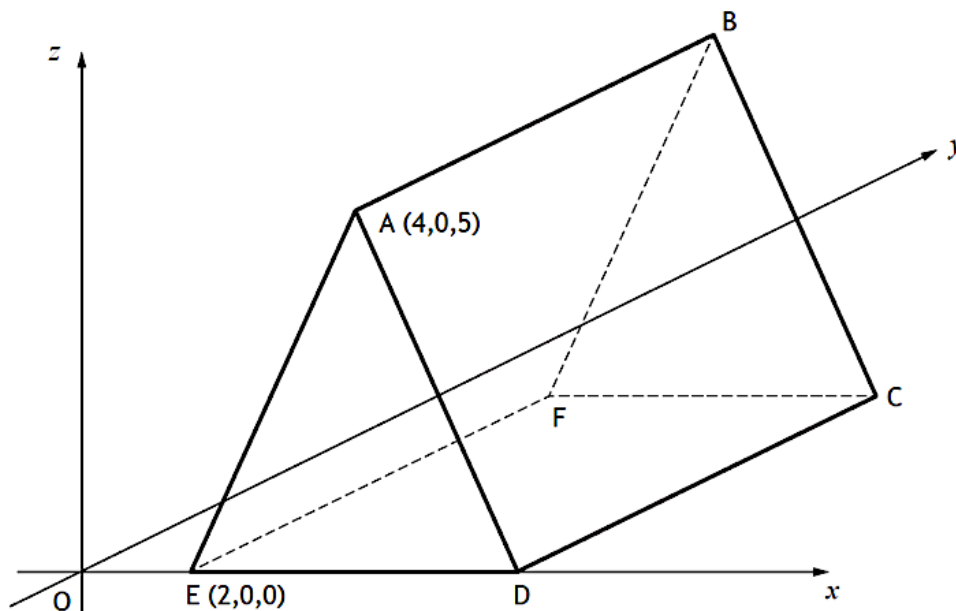
Two vectors are given by  $\mathbf{u} = \begin{pmatrix} 1 \\ 5 \\ 1 \end{pmatrix}$  and  $\mathbf{u} + \mathbf{v} = \begin{pmatrix} 6 \\ -4 \\ 3 \end{pmatrix}$ .

Find vector  $\mathbf{v}$ .

Express your answer in component form.

### 2018 Paper 1 Question 13, (2)

The diagram shows a triangular prism, ABCDEF, relative to the coordinate axes.



- $AD = AE$ .
- $DC = 8$  units.
- Edges  $EF$ ,  $DC$  and  $AB$  are parallel to the  $y$ -axis.

Write down the coordinates of  $B$  and  $C$ .

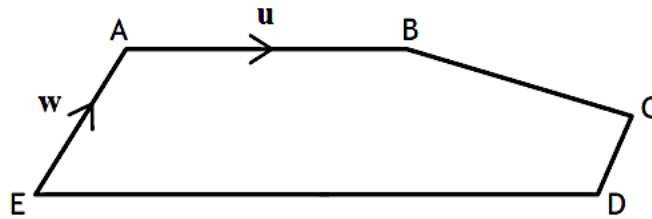
### 2018 Paper 2 Question 3, (2)

Find  $|\mathbf{r}|$ , the magnitude of vector  $\mathbf{r} = \begin{pmatrix} 24 \\ -12 \\ 8 \end{pmatrix}$ .



### 2018 Paper 2 Question 10, (2)

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



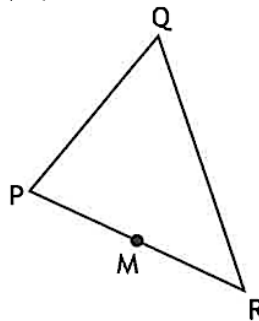
- $\vec{ED} = 2\vec{AB}$
- $\vec{EA} = 2\vec{DC}$

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

Give your answer in its simplest form.

### 2019 Paper 1 Question 10, (1) (2)

In triangle PQR,  $\vec{PR} = \begin{pmatrix} 6 \\ -4 \end{pmatrix}$  and  $\vec{RQ} = \begin{pmatrix} -1 \\ 8 \end{pmatrix}$ .



- (a) Express  $\vec{PQ}$  in component form.

M is the midpoint of PR.

- (b) Express  $\vec{MQ}$  in component form.



2019 Paper 2 Question 2, (2)

Find  $|\mathbf{p}|$ , the magnitude of vector  $\mathbf{p} = \begin{pmatrix} 6 \\ 27 \\ -18 \end{pmatrix}$ .