National 5 Mathematics

Vectors - Questions

Marks are indicated in brackets after each question number
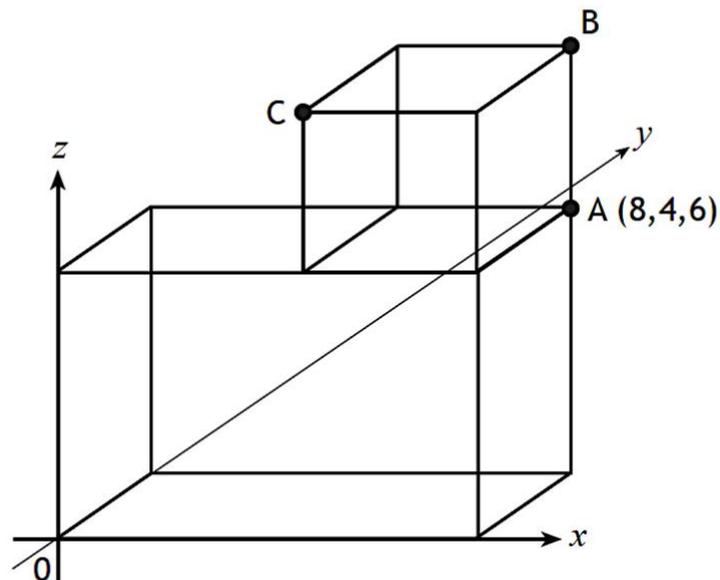
2014 Paper 1 Question 4, (2)

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

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.

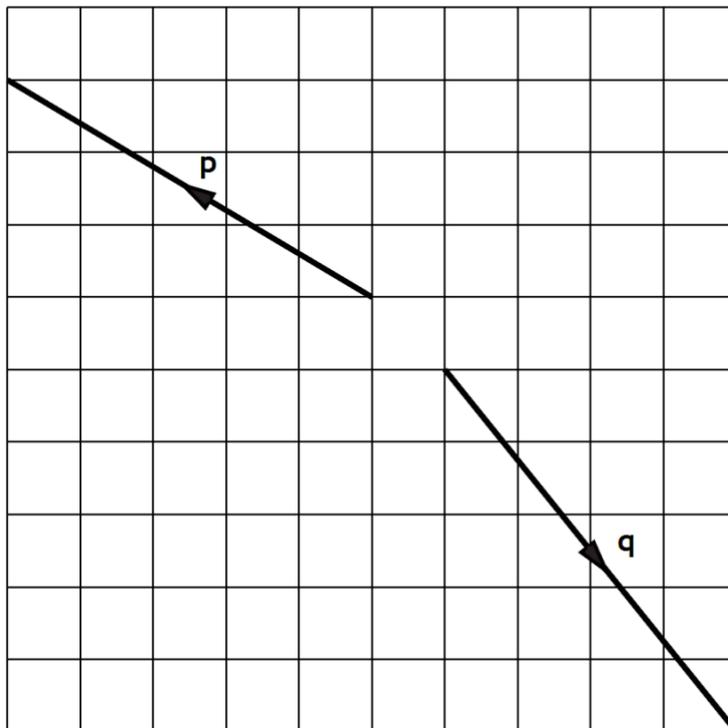Find |**u**|, the magnitude of vector **u** = $\begin{pmatrix} 6 \\ -13 \\ 18 \end{pmatrix}$.

2015 Paper 2 Question 5, (2)

The vectors **p** and **q** are shown in the diagram below.

Find the resultant vector **p** + **q**.

Express your answer in component form.

2016 Paper 1 Question 1, (2)
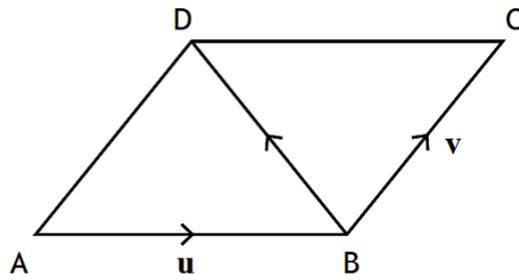
Given **p** = $\begin{pmatrix} 4 \\ -6 \end{pmatrix}$ and **q** = $\begin{pmatrix} -5 \\ -1 \end{pmatrix}$.

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

Express your answer in component form.

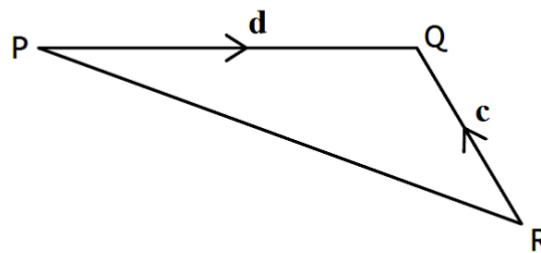$\overrightarrow{AB}$ represents vector **u** and $\overrightarrow{BC}$ represents vector **v**.

Express $\overrightarrow{BD}$ in terms of **u** and **v**.

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

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

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

The line QP is extended to T.
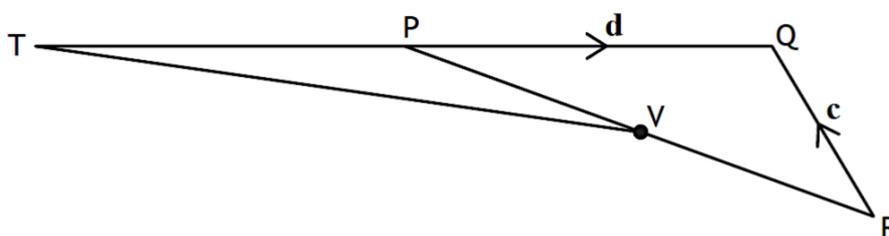
- TP = PQ
- V is the midpoint of PR

(b) Express $\overrightarrow{TV}$ in terms of **c** and **d**.
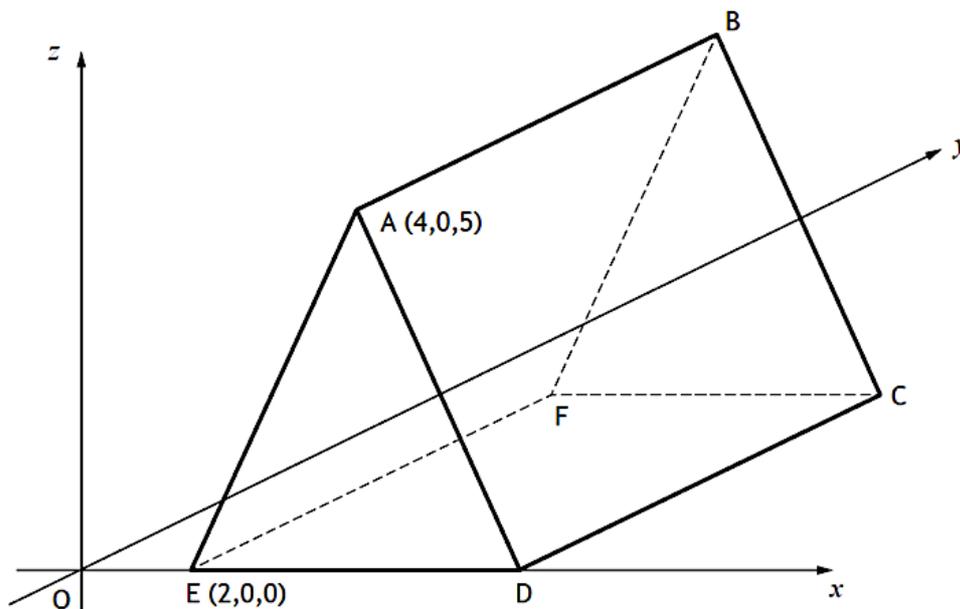
Give your answer in simplest form.

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.
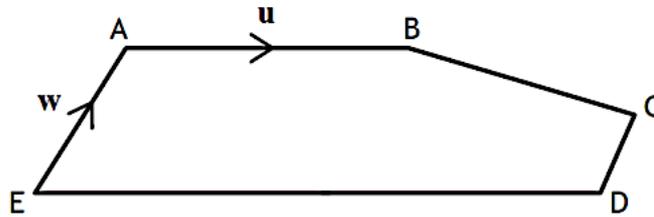
Write down the coordinates of B and C.

2018 Paper 2 Question 3, (2)

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

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

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

Express $\overrightarrow{BC}$ in terms of **u** and **w**.

Give your answer in its simplest form.

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

In triangle PQR, $\overrightarrow{PR} = \begin{pmatrix} 6 \\ -4 \end{pmatrix}$ and $\overrightarrow{RQ} = \begin{pmatrix} -1 \\ 8 \end{pmatrix}$.
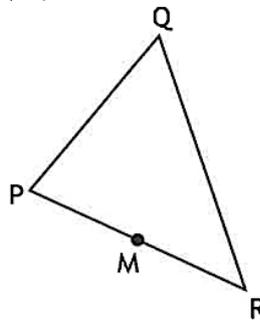
(a) Express $\overrightarrow{PQ}$ in component form.

M is the midpoint of PR.

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

2019 Paper 2 Question 2, (2)

Find $|\mathbf{p}|$, the magnitude of vector $\mathbf{p} = \begin{pmatrix} 6 \\ 27 \\ -18 \end{pmatrix}$.
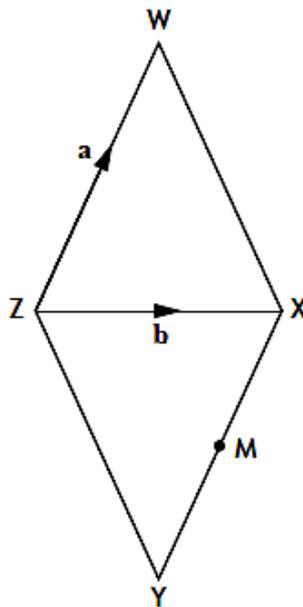
2024 Paper 1 Question 4, (2)

Given $\mathbf{a} = \begin{pmatrix} 3 \\ 4 \\ -1 \end{pmatrix}$ and $\mathbf{b} = \begin{pmatrix} 5 \\ 3 \\ 2 \end{pmatrix}$, find the resultant vector $3\mathbf{a} + \mathbf{b}$.

Express your answer in component form.

2024 Paper 1 Question 15, (1) (2)

The diagram shows a rhombus WXYZ with a diagonal ZX drawn.

$\overrightarrow{ZW}$ represents vector **a** and $\overrightarrow{ZX}$ represents vector **b**.

(a) Express $\overrightarrow{WX}$ in terms of **a** and **b**.

M is the mid-point of XY.

(b) Express $\overrightarrow{WM}$ in terms of **a** and **b**.

Give your answer in its simplest form.
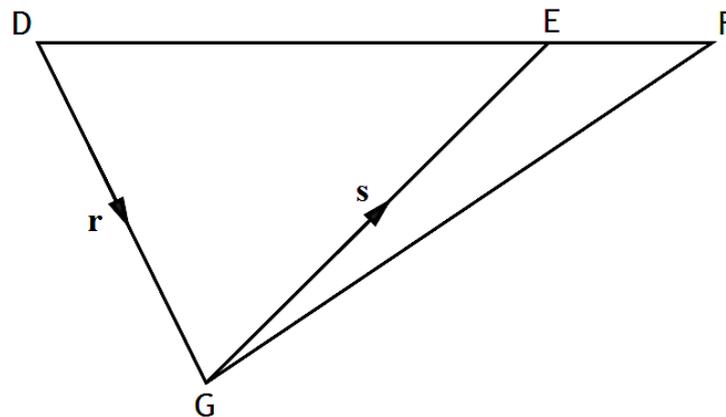
2025 Paper 1 Question 13, (2)

Vectors $\mathbf{p}$ and $\mathbf{q}$ have components $\mathbf{p} = \begin{pmatrix} 5 \\ 2 \end{pmatrix}$ and $\mathbf{q} = \begin{pmatrix} 1 \\ -3 \end{pmatrix}$.

Draw the resultant vector $\mathbf{p} + \mathbf{q}$ on the grid.

(An additional grid, if required, can be found on *page 14*.)

2025 Paper 2 Question 15, (2)

In the diagram, $\overrightarrow{DG}$ and $\overrightarrow{GE}$ are represented by the vectors $\mathbf{r}$ and $\mathbf{s}$ respectively, and $\overrightarrow{DE} = 3\overrightarrow{EF}$.

Express $\overrightarrow{GF}$ in terms of $\mathbf{r}$ and $\mathbf{s}$.

Give your answer in its simplest form.