

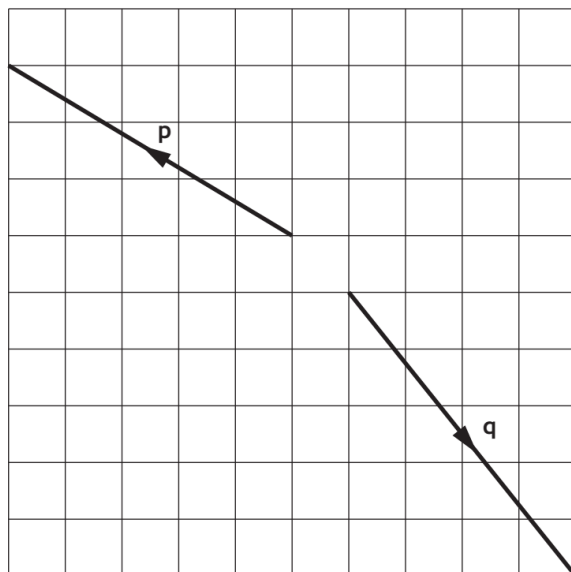
Vectors

YEAR	PAPER	QUESTION
2014	1	<p>Find the resultant vector $2\mathbf{u} - \mathbf{v}$ when $\mathbf{u} = \begin{pmatrix} -2 \\ 3 \\ 5 \end{pmatrix}$ and $\mathbf{v} = \begin{pmatrix} 0 \\ -4 \\ 7 \end{pmatrix}$.</p> <p>Express your answer in component form. 2</p>
2014	2	<p>The diagram shows a cube placed on top of a cuboid, relative to the coordinate axes.</p> <div style="text-align: center;"> </div> <p>A is the point (8,4,6). Write down the coordinates of B and C. 2</p>
2015	2	<p>Find \mathbf{u}, the magnitude of vector $\mathbf{u} = \begin{pmatrix} 6 \\ -13 \\ 18 \end{pmatrix}$. 2</p>

2015

2

5. 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.



2

2016

1

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

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

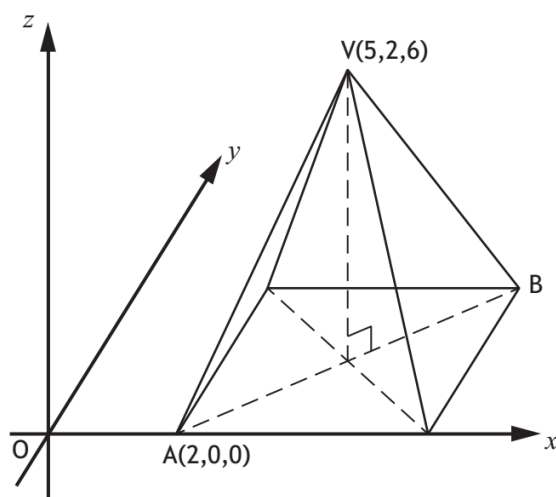
Express your answer in component form.

2

2016

1

The diagram shows a rectangular based pyramid, relative to the coordinate axes.



- A is the point $(2, 0, 0)$.
- V is the point $(5, 2, 6)$.

(a) Write down the coordinates of B.

1

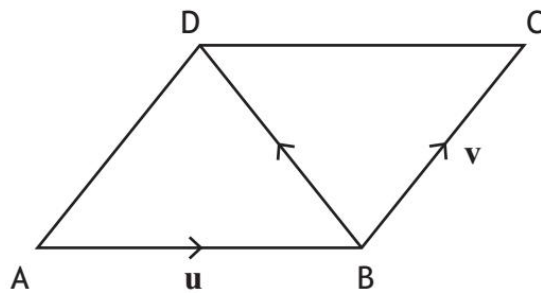
(b) Calculate the length of edge AV of the pyramid.

3

2016

2

The diagram below shows parallelogram ABCD.



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

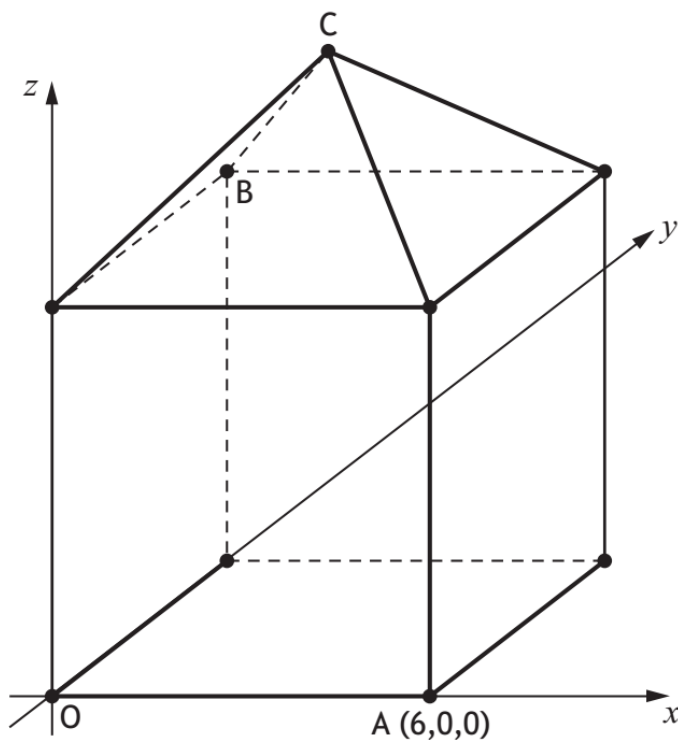
Express \vec{BD} in terms of \mathbf{u} and \mathbf{v} .

1

2017

1

The diagram shows a square-based pyramid placed on top of a cube, relative to the coordinate axes.



The height of the pyramid is half of the height of the cube.

A is the point $(6,0,0)$.

The point C is directly above the centre of the base.

Write down the coordinates of B and C.

2

2017

2

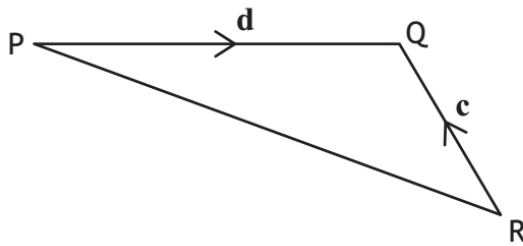
Find $|\mathbf{v}|$, the magnitude of vector $\mathbf{v} = \begin{pmatrix} 18 \\ -14 \\ 3 \end{pmatrix}$.

2

2017

2

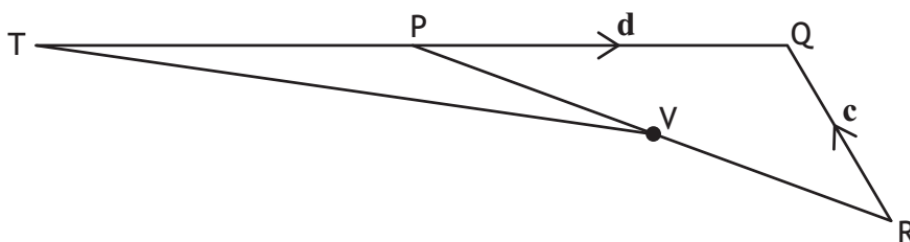
In the diagram below, \vec{RQ} and \vec{PQ} represent the vectors \mathbf{c} and \mathbf{d} respectively.



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

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

2018

1

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.

2

2018

2

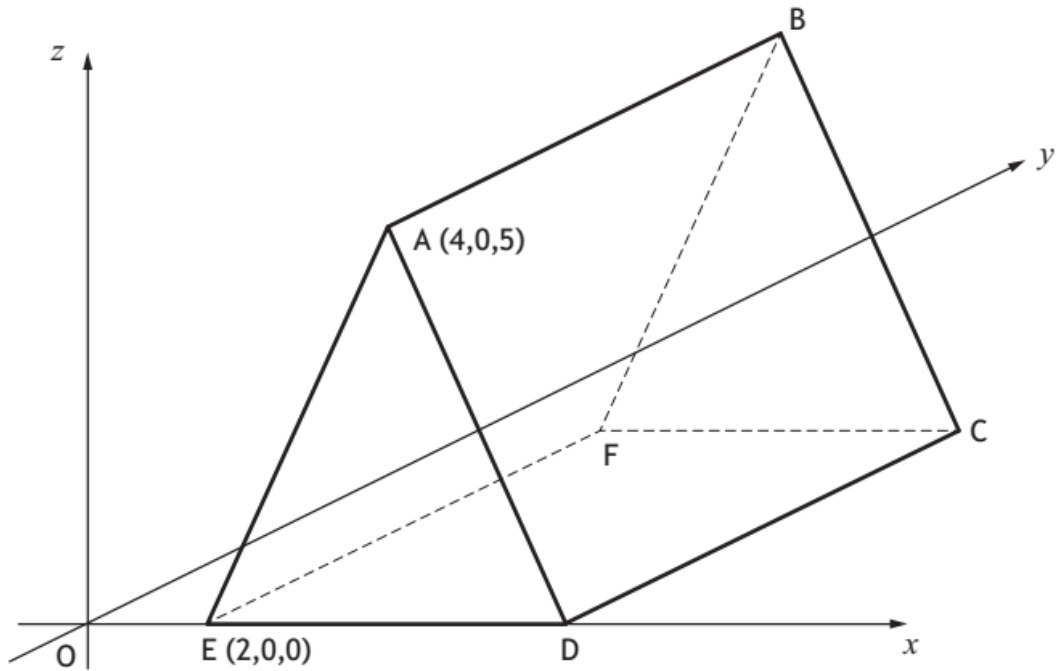
Find $|\mathbf{r}|$, the magnitude of vector $\mathbf{r} = \begin{pmatrix} 24 \\ -12 \\ 8 \end{pmatrix}$.

2

2018

1

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.

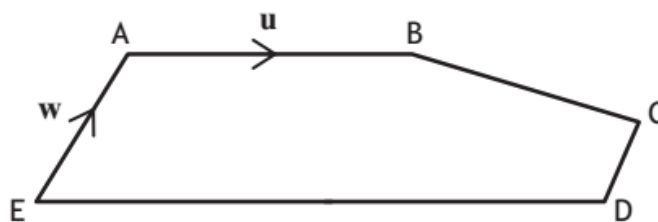
Write down the coordinates of B and C.

2

2018

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} .

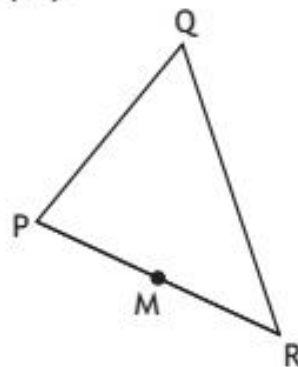
Give your answer in its simplest form.

2

2019

1

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.

1

M is the midpoint of PR.

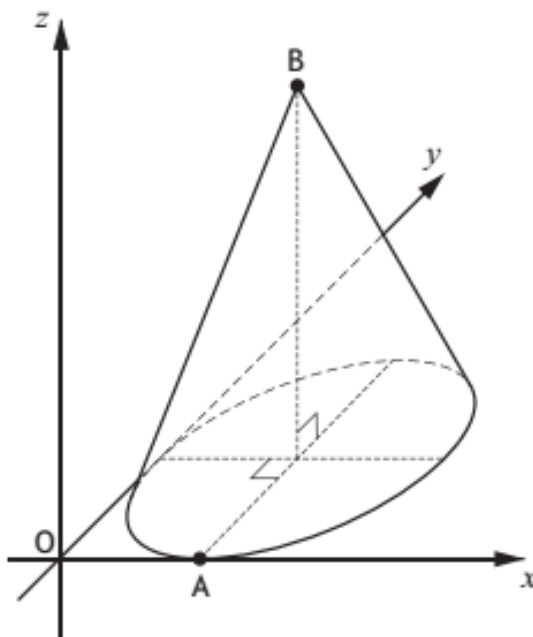
(b) Express \vec{MQ} in component form.

2

2019

2

The diagram shows a cone with diameter 6 units and height 8 units.



- The x -axis and the y -axis are tangents to the base
- A is the point of contact between the base and the x -axis
- B is directly above the centre of the base

Write down the coordinates of A and B.

2