

Column Vectors

Please write clearly in block capitals

Forename:

Surname:

Materials

For this paper you must have:

- mathematical instruments



You must **not** use a calculator.

Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer all questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- You may ask for graph paper, tracing paper and more answer paper. These must be tagged securely to this answer book.

Advice

- In all calculations, show clearly how you work out your answer.

1 On the axes below, draw the vectors from the point stated:

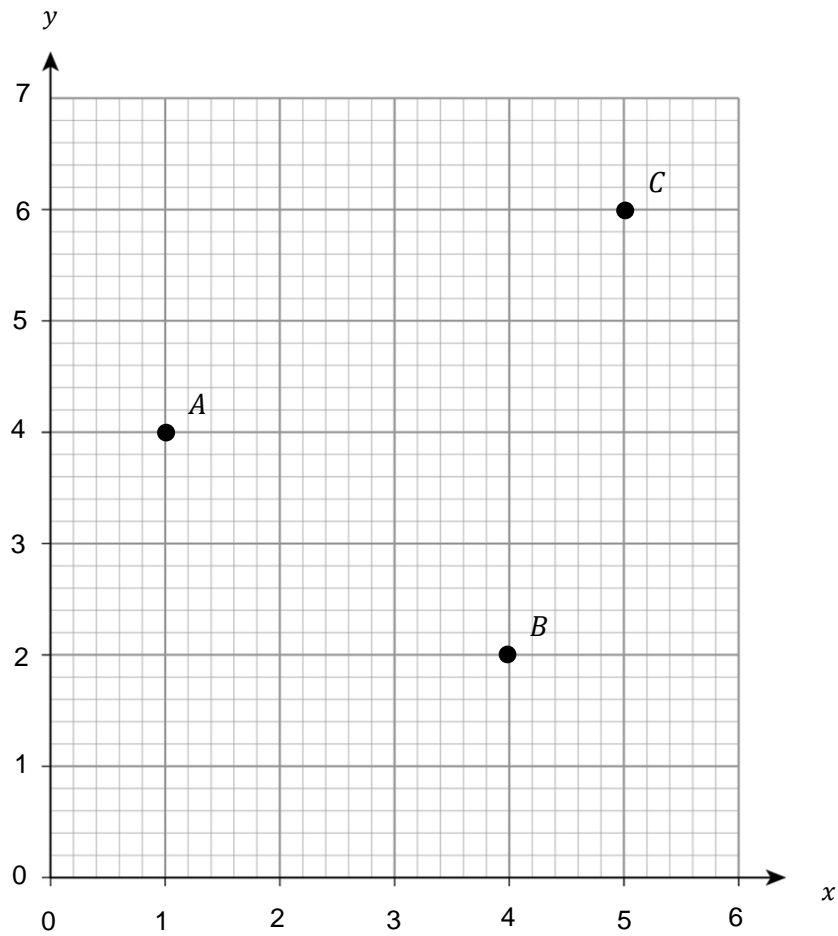
(Level 4)

$$\begin{pmatrix} 1 \\ 3 \end{pmatrix} \text{ from } A$$

$$\begin{pmatrix} 2 \\ -1 \end{pmatrix} \text{ from } B$$

$$\begin{pmatrix} -4 \\ -5 \end{pmatrix} \text{ from } C$$

[3 marks]



Turn over for next question

Turn over ►

2

Given the vectors:

(Level 4)

$$\mathbf{a} \begin{pmatrix} 2 \\ 3 \end{pmatrix}$$

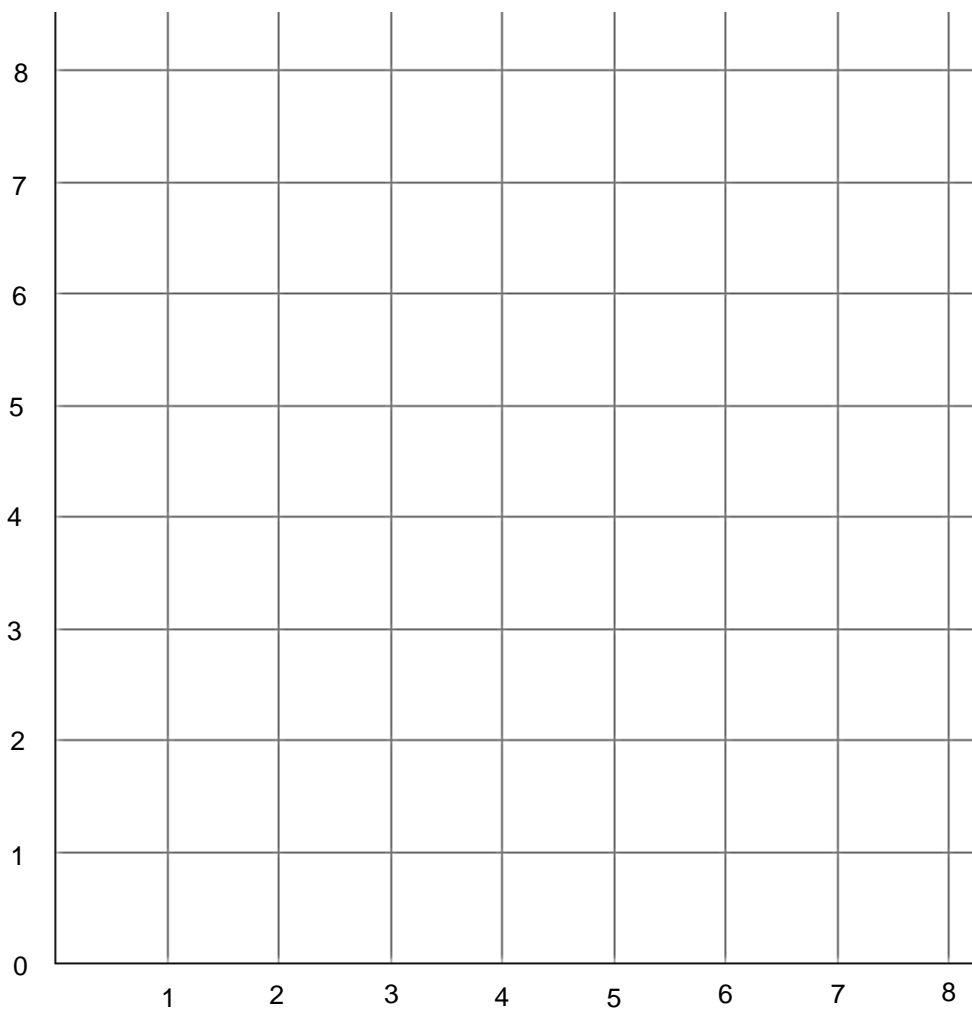
$$\mathbf{b} \begin{pmatrix} 1 \\ 5 \end{pmatrix}$$

Draw and label the following vectors from the origin on the axes below:

$$2\mathbf{a}$$

$$\mathbf{a} + \mathbf{b}$$

$$4\mathbf{a} - 2\mathbf{b}$$

[3 marks]

Turn over for next question

Turn over ►

3 Given the following vectors:

(Level 4)

$$a \begin{pmatrix} 2 \\ 5 \end{pmatrix}$$

$$b \begin{pmatrix} 10 \\ -4 \end{pmatrix}$$

$$c \begin{pmatrix} -3 \\ -7 \end{pmatrix}$$

Write the following expressions as a single column vector;

3(a)

$$a + b$$

[1 mark]

Answer _____

3(b)

$$c + b$$

[1 mark]

Answer _____

3(c)

$$-c - a$$

[1 mark]

Answer _____



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4 Given the following vectors:

(Level 4)

$$\mathbf{a} = \begin{pmatrix} 3 \\ 1 \end{pmatrix}$$

$$\mathbf{b} = \begin{pmatrix} 5 \\ -2 \end{pmatrix}$$

$$\mathbf{c} = \begin{pmatrix} 2 \\ 7 \end{pmatrix}$$

Write the following expressions as a single column vector;

4(a)

$$\mathbf{a} + \mathbf{b}$$

[1 mark]

Answer _____

4(b)

$$2\mathbf{c} + \mathbf{b}$$

[1 mark]

Answer _____

4(c)

$$3\mathbf{c} - 2\mathbf{b}$$

[1 mark]

Answer _____

4(d)

$$2\mathbf{a} - \mathbf{c}$$

[1 mark]

Answer _____

Turn over for next question

Turn over ►

5 Given the following vectors:

(Level 4)

$$\mathbf{a} = \begin{pmatrix} 5 \\ -1 \end{pmatrix}$$

$$\mathbf{b} = \begin{pmatrix} 8 \\ -4 \end{pmatrix}$$

$$\mathbf{c} = \begin{pmatrix} 1 \\ 5 \end{pmatrix}$$

Write the following expressions as a single column vector;

5(a)

$$\mathbf{a} - \mathbf{b}$$

[1 mark]

Answer _____

5(b)

$$2\mathbf{c} + \mathbf{b} - \mathbf{a}$$

[1 mark]

Answer _____

5(c)

$$3\mathbf{c} + \mathbf{b}$$

[1 mark]

Answer _____

5(d)

$$2\mathbf{a} - \frac{1}{2}\mathbf{b}$$

[1 mark]

Answer _____

Turn over for next question

