MME

GCSE MATHEMATICS
AQA | Edexcel | OCR | WJEC

Column Vectors

Please write clearly in block capitals

| Forename: |
| Surname: |

Materials

For this paper you must have:
• mathematical instruments

You *can* 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

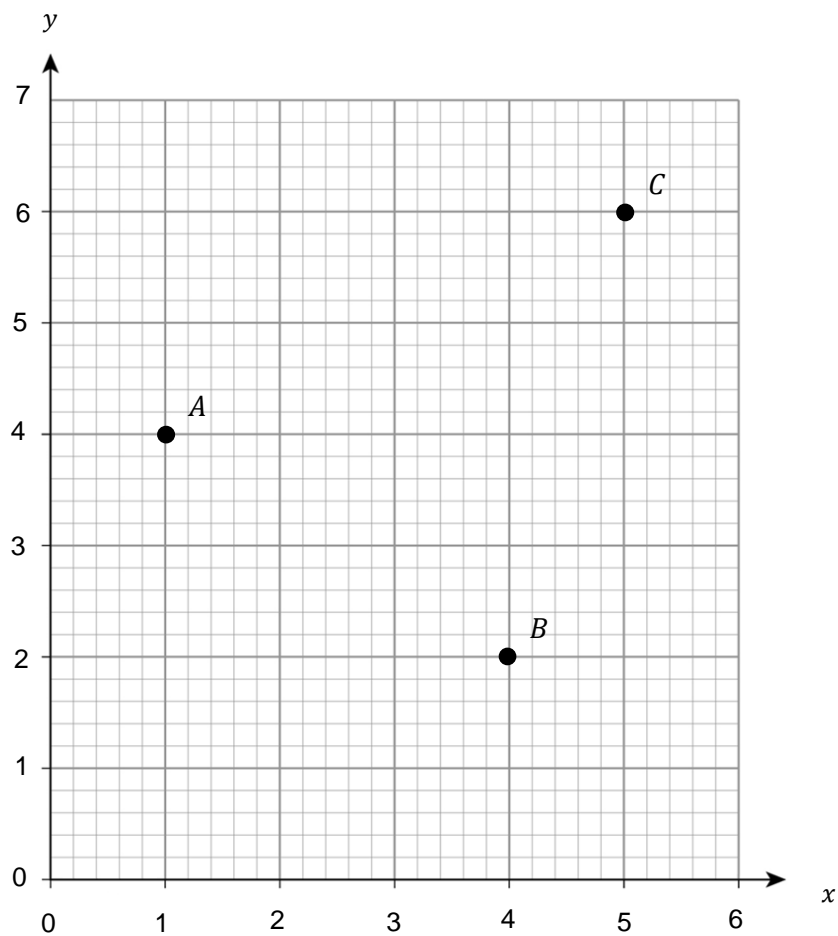• In all calculations, show clearly how you work out your answer.

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

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

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

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

[3 marks]

Turn over for next question

Turn over ▶

2 Given the vectors:

$a \begin{pmatrix} 2 \\ 3 \end{pmatrix}$
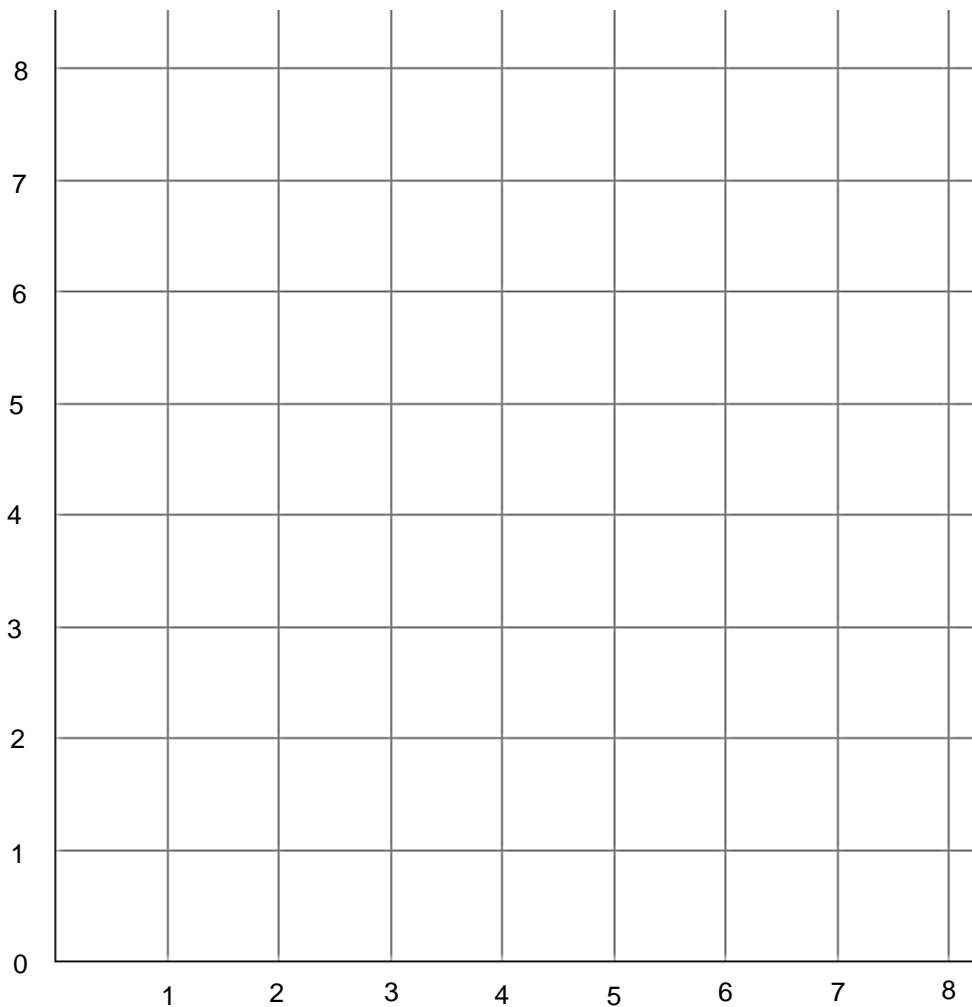
$b \begin{pmatrix} 1 \\ 5 \end{pmatrix}$

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

$2a$

$a + b$

$4a - 2b$

[3 marks]

Turn over for next question

3   Given the following vectors:

$$a \begin{pmatrix} 2 \\ 5 \end{pmatrix} \qquad\qquad b \begin{pmatrix} 10 \\ -4 \end{pmatrix} \qquad\qquad c \begin{pmatrix} -3 \\ -7 \end{pmatrix}$$

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 _____

3

Turn over ►

4   Given the following vectors:

$$a = \begin{pmatrix} 3 \\ 1 \end{pmatrix} \qquad\qquad b = \begin{pmatrix} 5 \\ -2 \end{pmatrix} \qquad\qquad c = \begin{pmatrix} 2 \\ 7 \end{pmatrix}$$

Write the following expressions as a single column vector;

4(a) $a + b$

[1 mark]

Answer _____

4(b) $2c + b$

[1 mark]

Answer _____

4(c) $3c - 2b$

[1 mark]

Answer _____

4(d) $2a - c$

[1 mark]

Answer _____

Turn over for next question

4

Turn over ▶

5 Given the following vectors:

$$a = \begin{pmatrix} 5 \\ -1 \end{pmatrix} \qquad b = \begin{pmatrix} 8 \\ -4 \end{pmatrix} \qquad c = \begin{pmatrix} 1 \\ 5 \end{pmatrix}$$

Write the following expressions as a single column vector;

5(a) $$a - b$$

[1 mark]

_____

_____

Answer _____

5(b) $$2c + b - a$$

[1 mark]

_____

_____

Answer _____

5(c) $$3c + b$$

[1 mark]

_____

_____

Answer _____

5(d) $$2a - \frac{1}{2}b$$

[1 mark]

_____

_____

Answer _____

Turn over for next question

4

Turn over ►

6   Three vectors are listed below with some numbers missing.

$$a = \begin{pmatrix} 3 \\ 2 \end{pmatrix} \qquad b = \begin{pmatrix} x \\ y \end{pmatrix} \qquad c = \begin{pmatrix} 1 \\ z \end{pmatrix}$$

Use the following calculations.

$$a + b = \begin{pmatrix} 3 \\ 0 \end{pmatrix}$$

$$2c + b = \begin{pmatrix} 2 \\ 2 \end{pmatrix}$$

Find the value of x, y and z.

[2 marks]

$x =$ _____

$y =$ _____

$z =$ _____

End of Questions

2