

Name: _____

GCSE (1 – 9)

Vectors

Instructions

- Use **black** ink or ball-point pen.
- Answer all questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out.**

Information

- The marks for each question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end

1

$$\mathbf{a} = \begin{pmatrix} 2 \\ 3 \end{pmatrix} \text{ and } \mathbf{b} = \begin{pmatrix} 1 \\ 5 \end{pmatrix}$$

(a) Write down as a column vector

(i) $\mathbf{a} + \mathbf{b}$

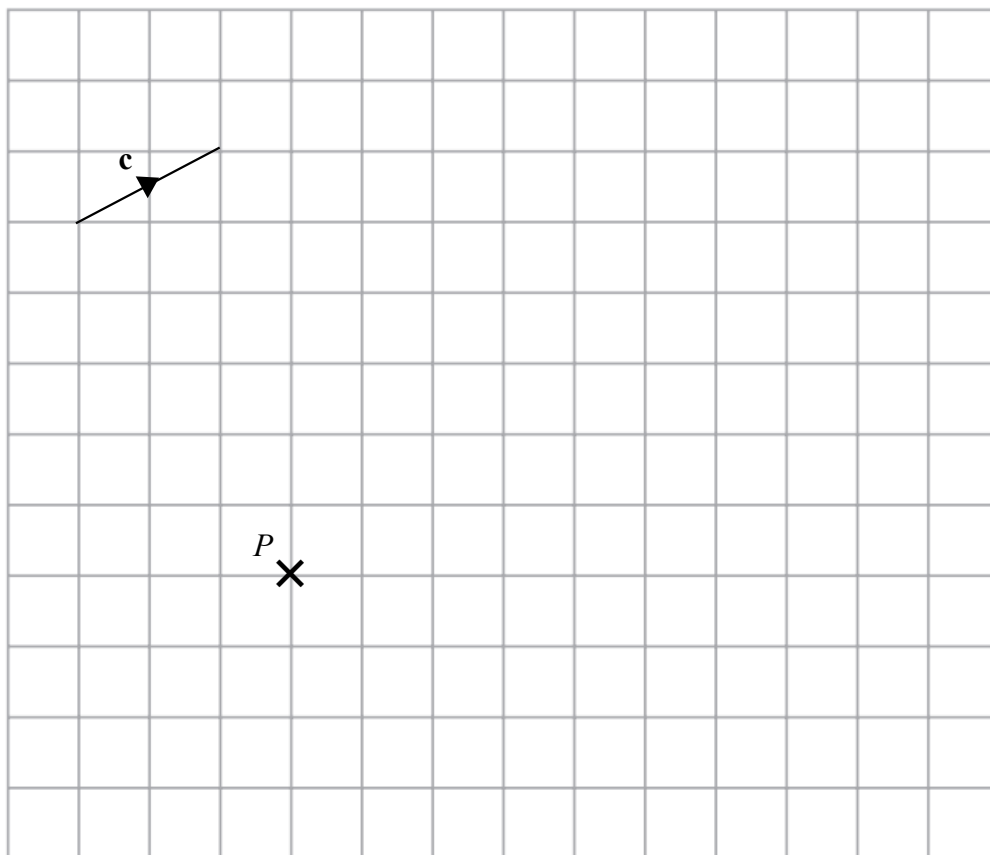
.....
(1)

(ii) $2\mathbf{a} + 3\mathbf{b}$

.....
(2)

The vector \mathbf{c} is drawn on the grid.

(b) From the point P , draw the vector $4\mathbf{c}$



(1)

(Total for question 1 is 4 marks)

2

$$\mathbf{a} = \begin{pmatrix} 4 \\ 1 \end{pmatrix} \text{ and } \mathbf{b} = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$$

(a) Write down as a column vector

(i) $\mathbf{a} + \mathbf{b}$

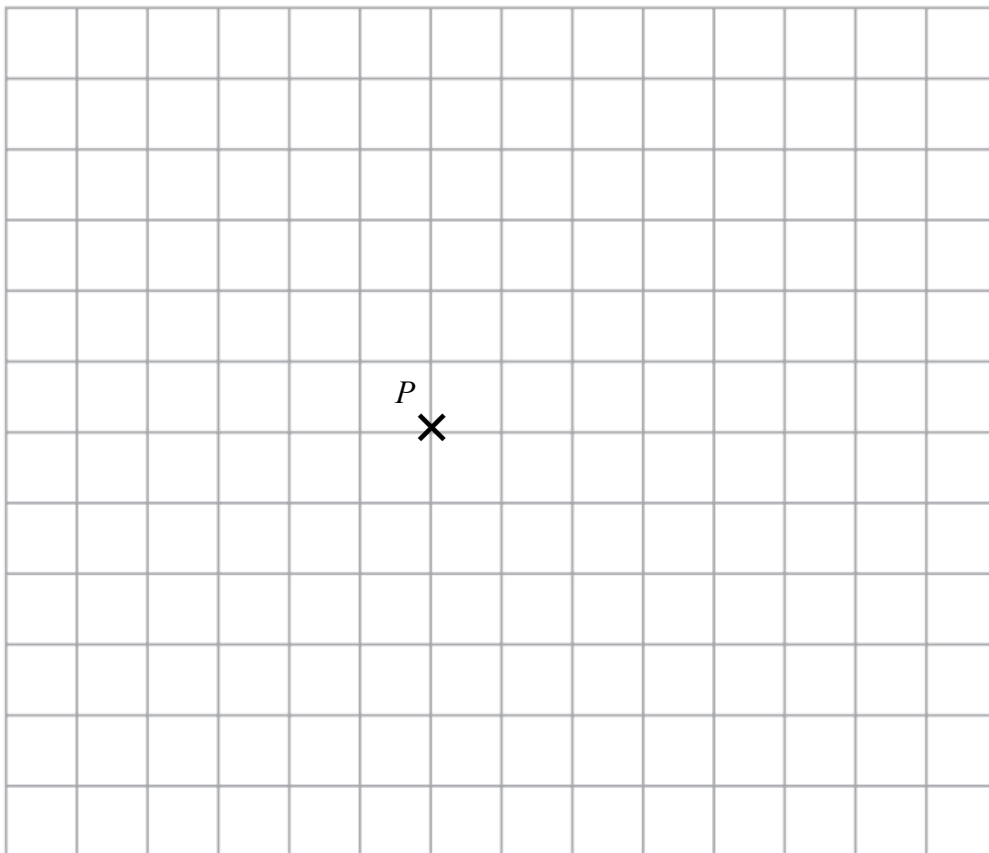
.....
(1)

(ii) $2\mathbf{a} - \mathbf{b}$

.....
(2)

$$\mathbf{c} = \begin{pmatrix} 5 \\ -4 \end{pmatrix}$$

(b) From the point P , draw the vector \mathbf{c}



(1)

(Total for question 2 is 4 marks)

3

$$\mathbf{a} = \begin{pmatrix} -2 \\ 3 \end{pmatrix} \text{ and } \mathbf{b} = \begin{pmatrix} 5 \\ -1 \end{pmatrix}$$

(a) Write down as a column vector

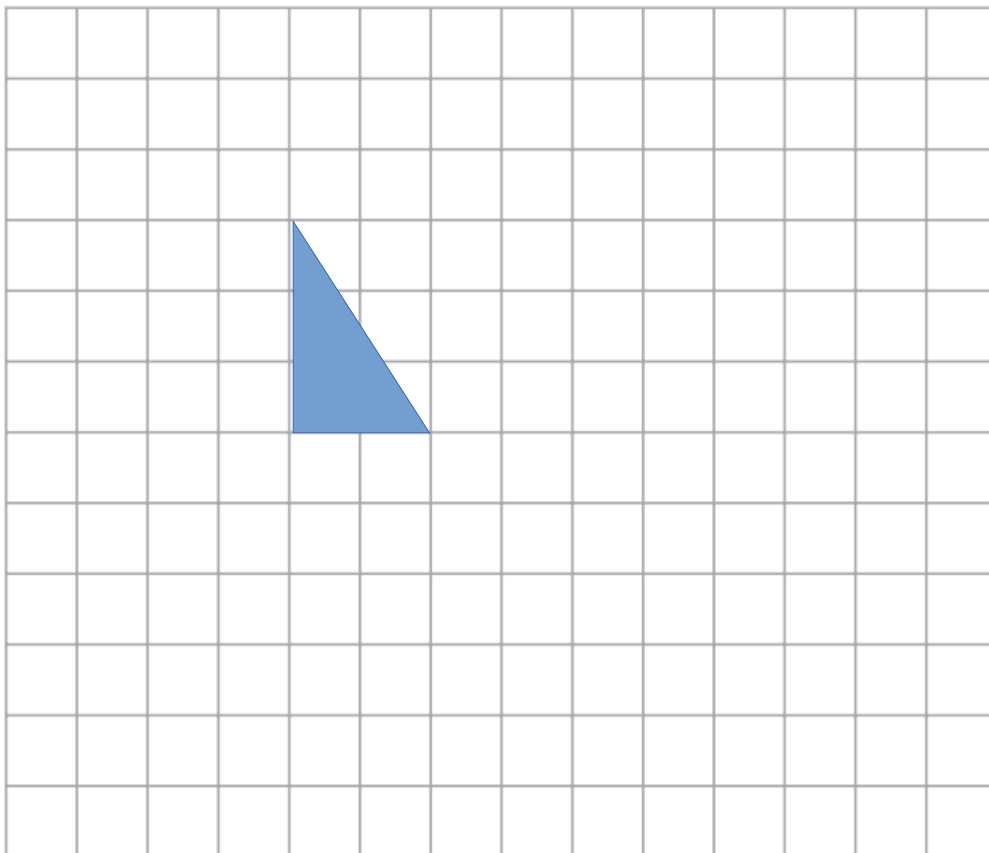
(i) $\mathbf{a} + \mathbf{b}$

.....
(1)

(ii) $2\mathbf{a} - \mathbf{b}$

.....
(2)

(b) Translate the triangle by the vector $\begin{pmatrix} 3 \\ -2 \end{pmatrix}$



(1)

(Total for question 3 is 4 marks)

4 A is the point $(3, 2)$ and B is the point $(4, -1)$.

(a) Write down as a column vector \vec{AB}

.....
(1)

C is the point $(5, -2)$ and D is the point $(2, 1)$.

(b) Write down as a column vector \vec{CD}

.....
(1)

(Total for question 4 is 2 marks)

5 A is the point $(5, -1)$ and B is the point $(4, -3)$.

(a) Write down as a column vector \vec{AB}

.....
(1)

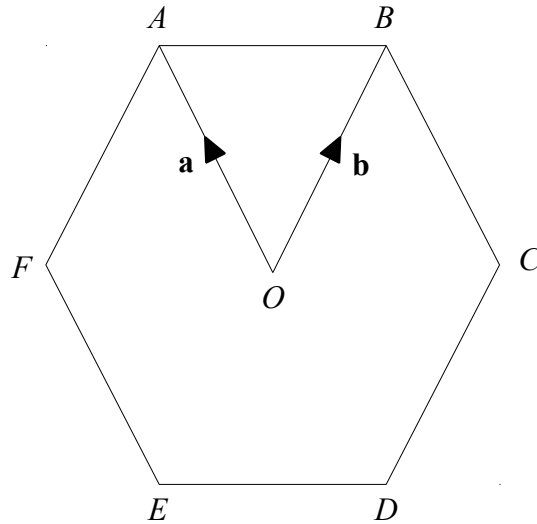
C is the point $(1, 6)$ and D is the point $(-3, 9)$.

(b) Write down as a column vector \vec{CD}

.....
(1)

(Total for question 5 is 2 marks)

6 $ABCDEF$ is a regular hexagon with centre O .



$$\vec{OA} = a$$

$$\vec{OB} = b$$

(a) Find, in terms of a , the vector \vec{AD}

.....
(1)

(b) Find, in terms of a and b , the vector \vec{AB}

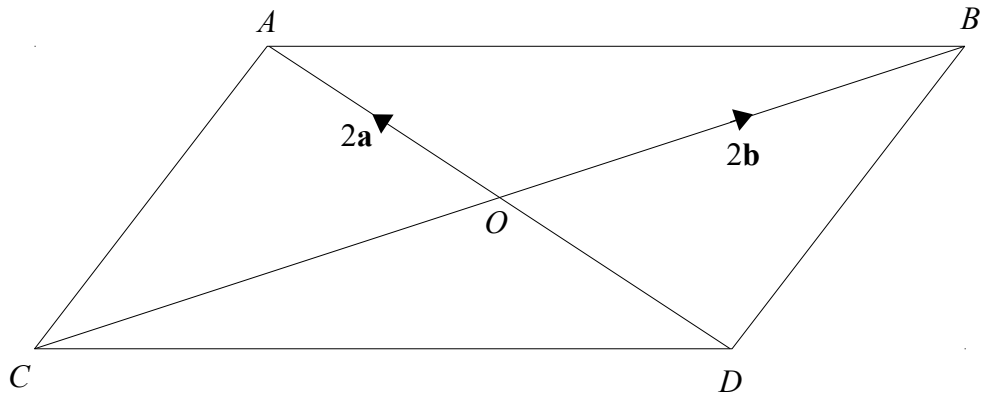
.....
(1)

(c) Find, in terms of a and b , the vector \vec{AF}

.....
(1)

(Total for question 6 is 3 marks)

7 The diagram shows a parallelogram.



$$\vec{OA} = 2a$$

$$\vec{OB} = 3b$$

(a) Find, in terms of a, the vector \vec{DA}

.....
(1)

(b) Find, in terms of a and b, the vector \vec{AB}

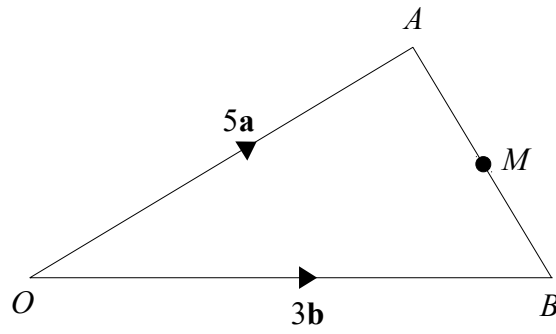
.....
(1)

(c) Find, in terms of a and b, the vector \vec{AC}

.....
(1)

(Total for question 7 is 3 marks)

8



$$\vec{OA} = 5\mathbf{a}$$

$$\vec{OB} = 3\mathbf{b}$$

M is the midpoint of AB

(a) Find, in terms of a and b, the vector \vec{AB}

.....
(1)

(b) Find, in terms of a and b, the vector \vec{AM}

.....
(1)

(c) Find, in terms of a and b, the vector \vec{OM}

.....
(1)

(Total for question 8 is 3 marks)