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

(a) Write down as a column vector

(i) **a** + **b**

…..........................

(1)

(ii) 2**a** + 3**b**

…..........................

(2)

The vector **c** is drawn on the grid.

(b) From the point P, draw the vector 4**c**

(1)
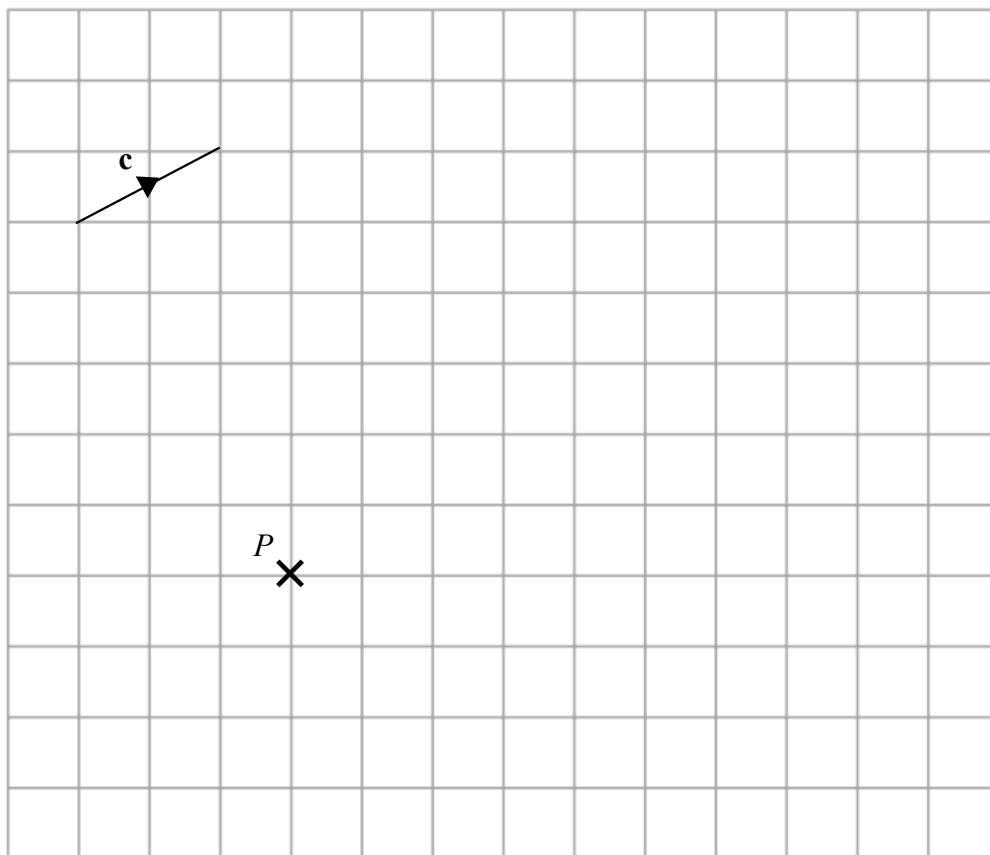
(Total for question 1 is 4 marks)

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

(a) Write down as a column vector

(i) **a** + **b**

…........................
(1)

(ii) 2**a** – **b**

…........................
(2)

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

(b) From the point P, draw the vector **c**

(1)
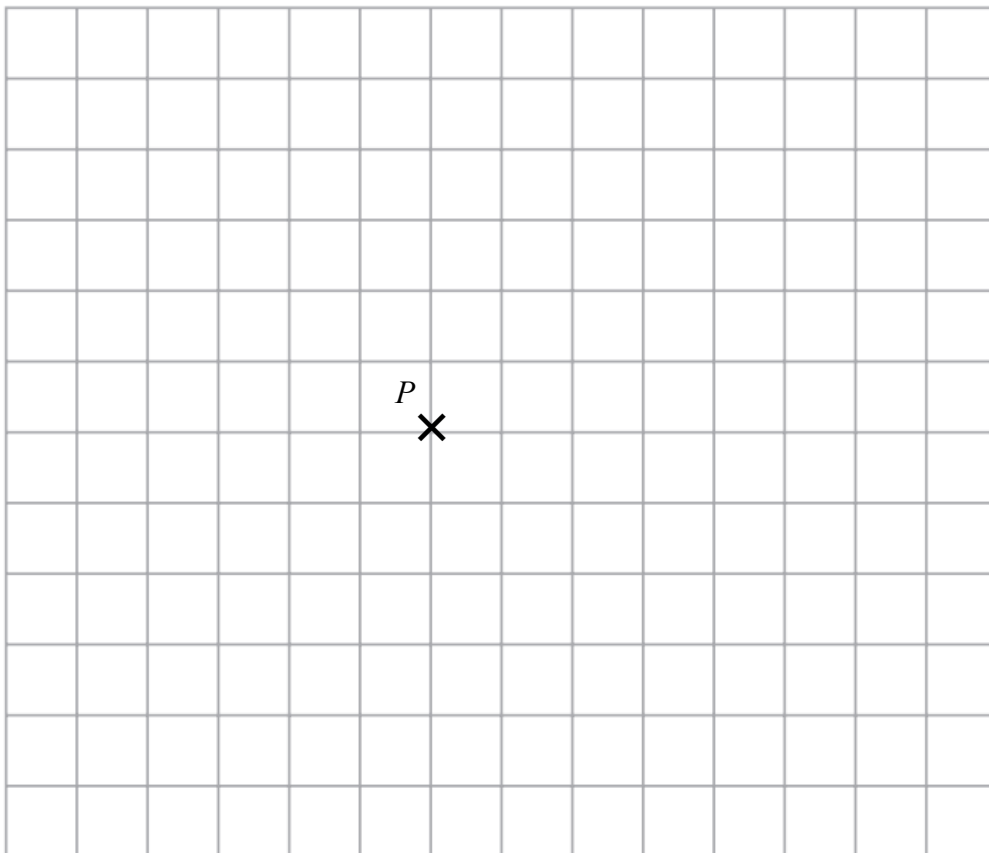
(Total for question 2 is 4 marks)

3 $a=\begin{pmatrix} -2 \\ 3 \end{pmatrix}$ and $b=\begin{pmatrix} 5 \\ -1 \end{pmatrix}$
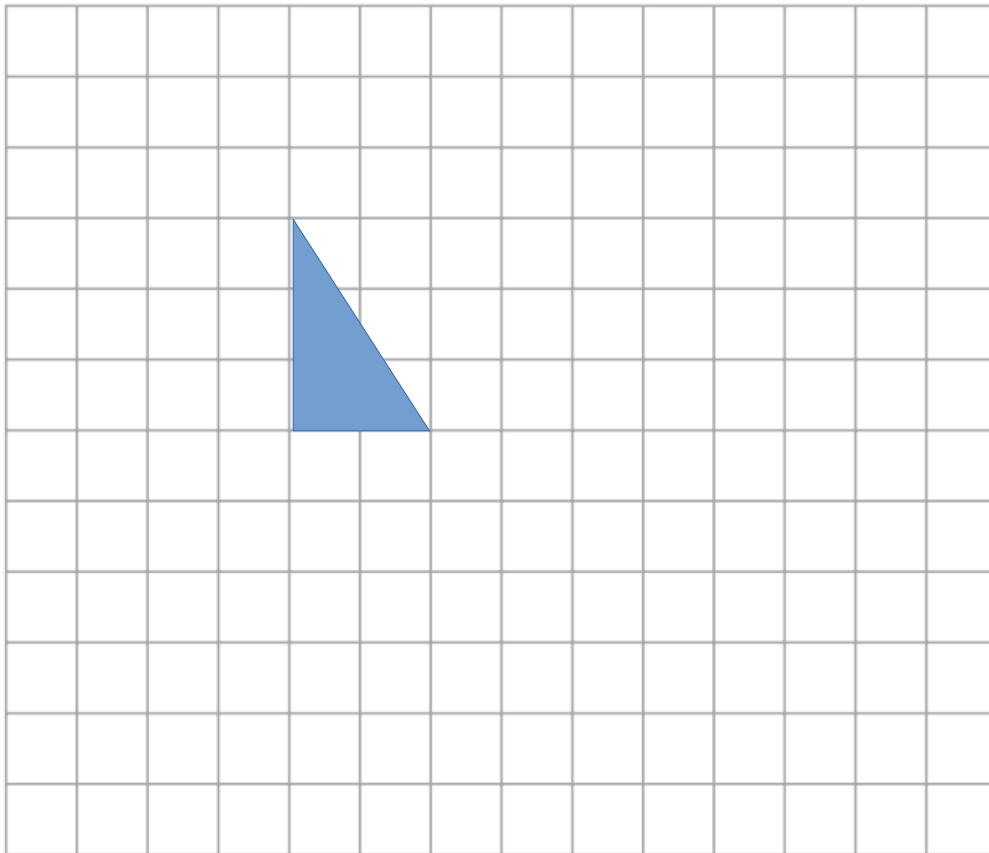
(a) Write down as a column vector

(i) **a** + **b**

…..........................
(1)

(ii) 2**a** – **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 $\overrightarrow{AB}$

…........................

(1)

C is the point (5, –2) and *D* is the point (2, 1).

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

…........................

(1)

(Total for question 4 is 2 marks)

5 *A* is the point (5, –1) and *B* is the point (4, –3).
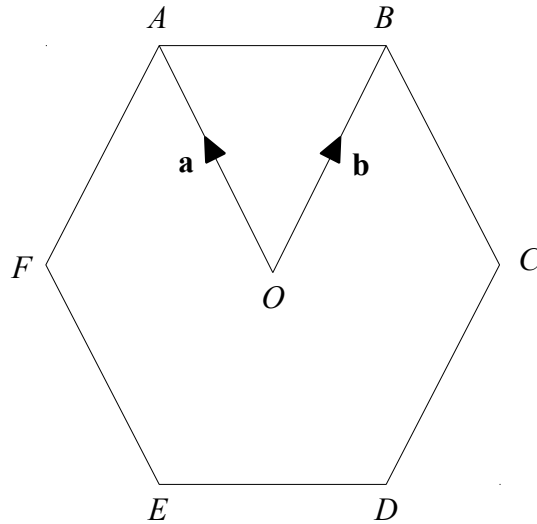
(a) Write down as a column vector $\overrightarrow{AB}$

…........................

(1)

C is the point (1, 6) and *D* is the point (–3, 9).

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

…........................

(1)

(Total for question 5 is 2 marks)

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

$\overrightarrow{OA} = a$

$\overrightarrow{OB} = b$

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

…..........................

(1)

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

…..........................

(1)

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

…..........................

(1)

(Total for question 6 is 3 marks)

7 The diagram shows a parallelogram.
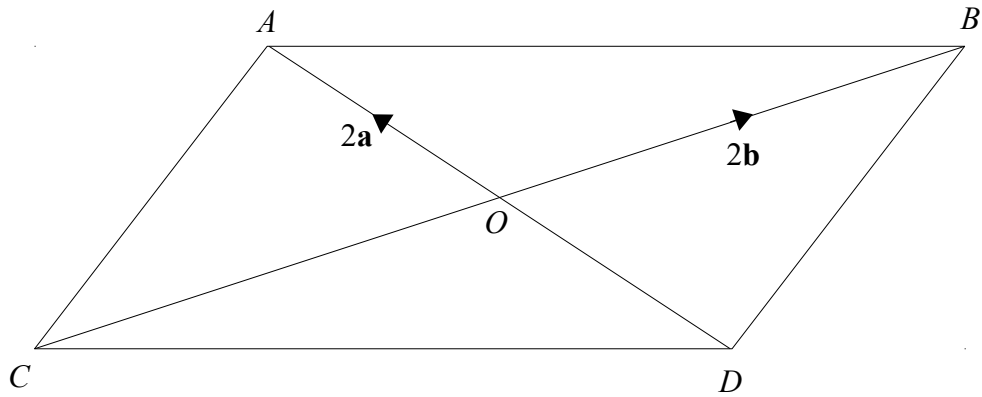
$\overrightarrow{OA} = 2\mathbf{a}$

$\overrightarrow{OB} = 2\mathbf{b}$

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

…........................

(1)

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

…........................

(1)

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

…........................

(1)

(Total for question 7 is 3 marks)

8
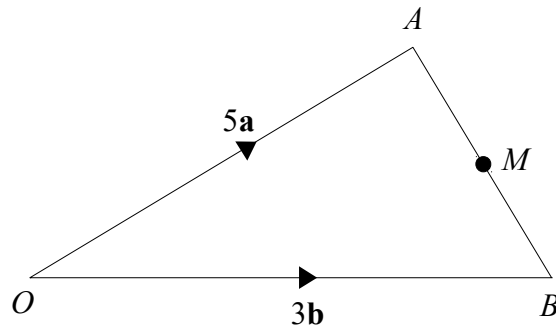
$\overrightarrow{OA}=5a$

$\overrightarrow{OB}=3b$

M is the midpoint of AB

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

…...........................

(1)

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

…...........................

(1)

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

…...........................

(1)

(Total for question 8 is 3 marks)