

Translations and Column Vectors

For Pearson Edexcel GCSE Mathematics (1MA1) • Foundation tier

Name _____

Total marks: **20**

Answer **all** questions in the spaces provided. Show your working: marks are given for correct method.

- 1** The point $(3, -1)$ is translated by the vector $\begin{pmatrix} -4 \\ 5 \end{pmatrix}$

Write down the coordinates of the image.

(..... ,)

(1)

(Total for Question 1 is 1 mark)

- 2** Write each translation as a column vector.

(a) 3 squares to the right and 5 squares down

$\begin{pmatrix} \\ \end{pmatrix}$

(1)

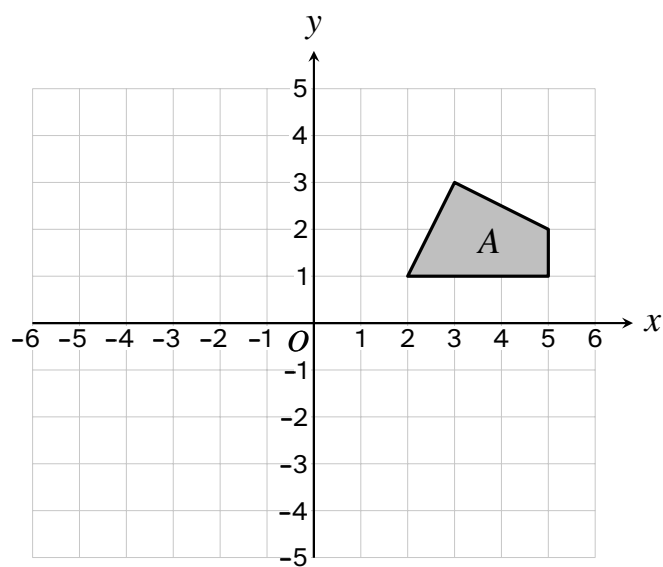
(b) 4 squares to the left and 2 squares up

$\begin{pmatrix} \\ \end{pmatrix}$

(1)

(Total for Question 2 is 2 marks)

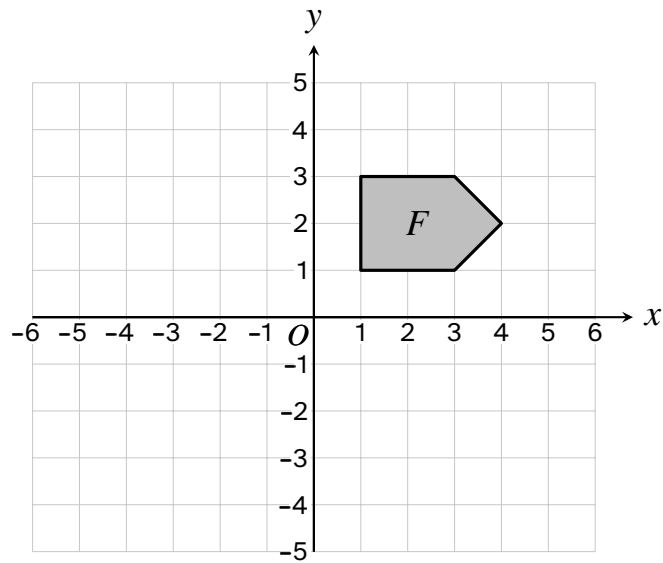
- 3 On the grid, translate shape A by the vector $\begin{pmatrix} -7 \\ -5 \end{pmatrix}$



(2)

(Total for Question 3 is 2 marks)

4 Here is shape F on a grid.



- (a) Translate shape F by the vector $\begin{pmatrix} -6 \\ 2 \end{pmatrix}$
Label the image C .

(1)

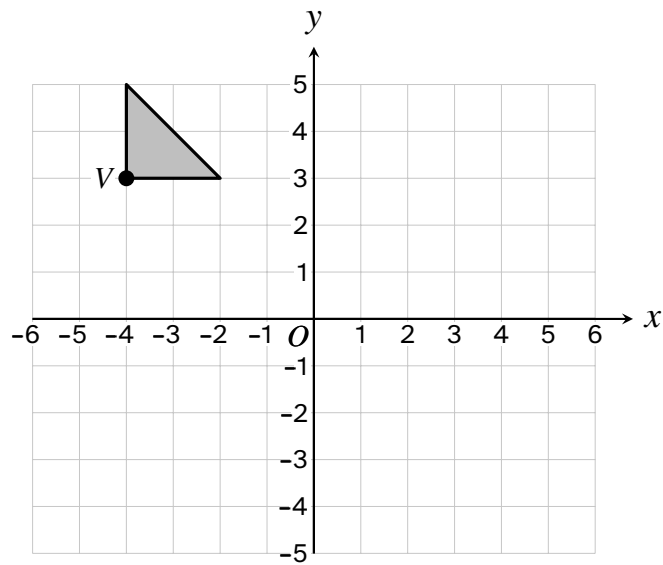
- (b) Translate shape F by the vector $\begin{pmatrix} 1 \\ -5 \end{pmatrix}$
Label the image D .

(1)

(Total for Question 4 is 2 marks)

5 Here is a triangle on a grid.

The triangle is translated so that the vertex V moves to the point $(1, -4)$
On the grid, draw the image of the triangle.



(2)

(Total for Question 5 is 2 marks)

6 $\mathbf{a} = \begin{pmatrix} 4 \\ -1 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} -2 \\ 3 \end{pmatrix}$
Write as a column vector

(a) $3\mathbf{a}$

$$\begin{pmatrix} \\ \end{pmatrix} \quad (1)$$

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

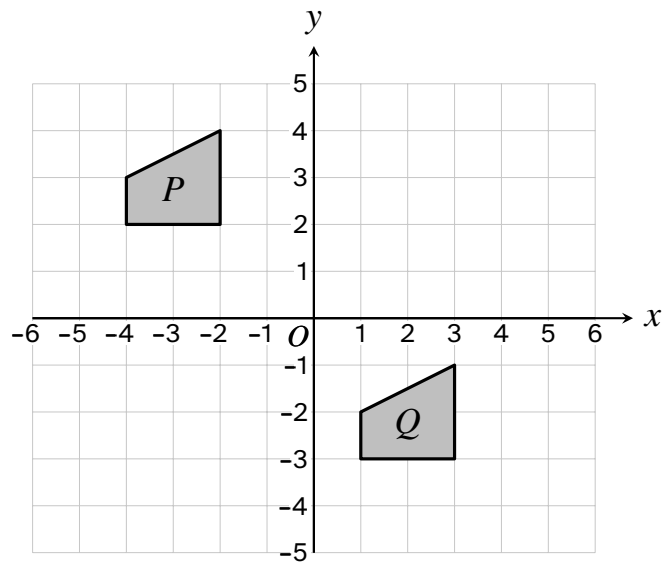
$$\begin{pmatrix} \\ \end{pmatrix} \quad (1)$$

(c) $\mathbf{a} + 2\mathbf{b}$

$$\begin{pmatrix} \\ \end{pmatrix} \quad (2)$$

(Total for Question 6 is 4 marks)

7 Here are two shapes, P and Q , on a grid.



(a) Describe fully the single transformation that maps shape P onto shape Q .

(2)

(b) Write down the column vector for the translation that maps shape Q onto shape P .

$$\begin{pmatrix} \\ \end{pmatrix}$$

(1)

(Total for Question 7 is 3 marks)

- 8 P is the point $(2, -3)$ and Q is the point $(-4, 1)$
Write down the column vector for the translation that maps P onto Q .

$$\begin{pmatrix} \\ \end{pmatrix}$$

(2)

(Total for Question 8 is 2 marks)

- 9 Shape S is translated by the vector $\begin{pmatrix} 2 \\ 5 \end{pmatrix}$ to give shape T .

Shape T is then translated by the vector $\begin{pmatrix} -6 \\ -1 \end{pmatrix}$ to give shape U .

Write down the column vector for the single translation that maps shape S onto shape U .

$$\begin{pmatrix} \\ \end{pmatrix}$$

(2)

(Total for Question 9 is 2 marks)
