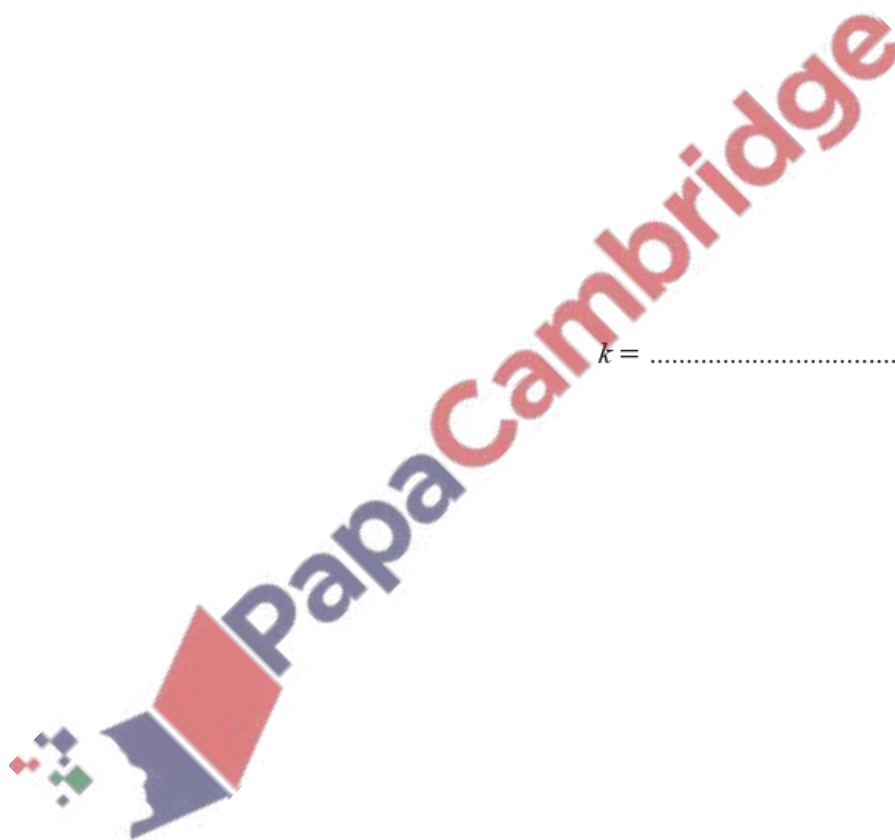**Matrices – 2022 O Level Math D**

1. June/2022/Paper_11/No.24

$$\mathbf{M} = \begin{pmatrix} 1 & 0 \\ 4 & 3 \end{pmatrix} \qquad \mathbf{N} = \begin{pmatrix} k & 0 \\ 1 & 4 \end{pmatrix}$$

Given that $\mathbf{MN} = \mathbf{NM}$, find the value of k.

$k = $ .... [3]

(a) The matrix **A** satisfies the following equation.

$$\begin{pmatrix} 2 & 3 \\ 5 & 2 \end{pmatrix} - 3\mathbf{A} = \begin{pmatrix} 5 & 3 \\ -4 & -1 \end{pmatrix}$$

Find **A**.

$$\mathbf{A} = \begin{pmatrix} & \\ & \end{pmatrix}$$ [2]
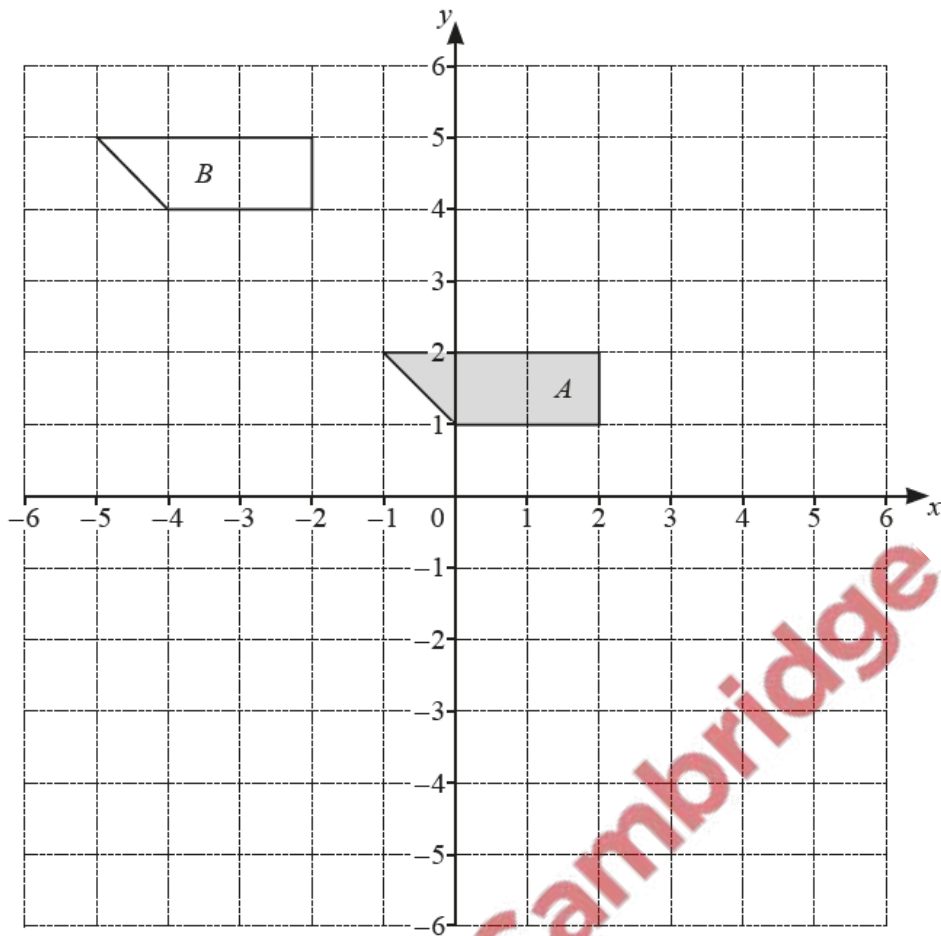
(b) $\mathbf{B} = \begin{pmatrix} 2 & -2 \\ 4 & p \end{pmatrix}$

The determinant of **B** is 2.

Find the value of p and hence write down $\mathbf{B}^{-1}$.

$$\mathbf{B}^{-1} = \begin{pmatrix} & \\ & \end{pmatrix}$$ [3]

(c)

The diagram shows shape A and shape B.

(i) Describe fully the **single** transformation that maps shape A onto shape B.

.... [2]

(ii) The transformation represented by the matrix $\begin{pmatrix} -2 & 0 \\ 0 & -2 \end{pmatrix}$ maps shape A onto shape C.

Draw and label shape C. [2]