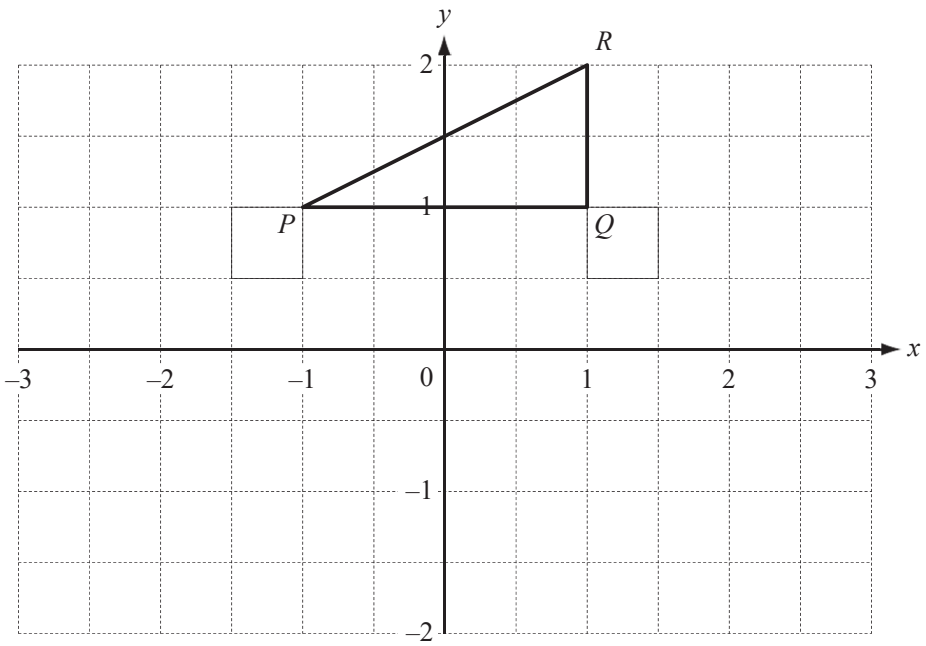
EXAM PAPERS PRACTICE

Transformations

Question Paper

Question 1

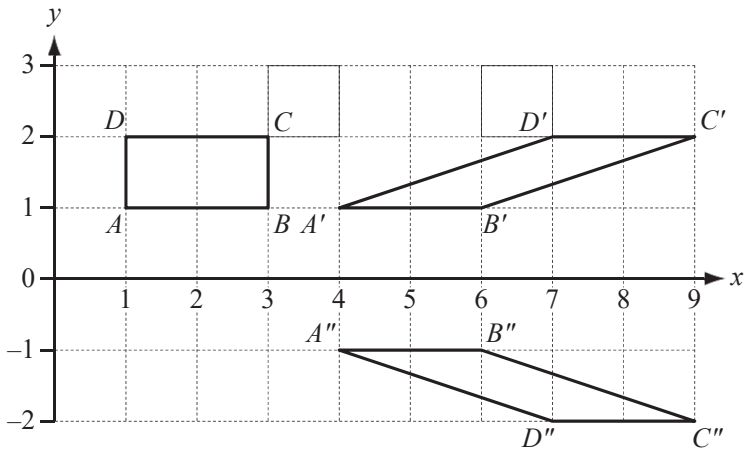


The triangle PQR has co-ordinates $P(-1, 1)$, $Q(1, 1)$ and $R(1, 2)$.

(a) Rotate triangle PQR by 90° clockwise about (0, 0).
Label your image $P'Q'R'$. [2]

(b) Reflect your triangle $P'Q'R'$ in the line $y = -x$.
Label your image $P''Q''R''$. [2]

(c) Describe fully the single transformation which maps triangle PQR onto triangle $P''Q''R''$. [2]

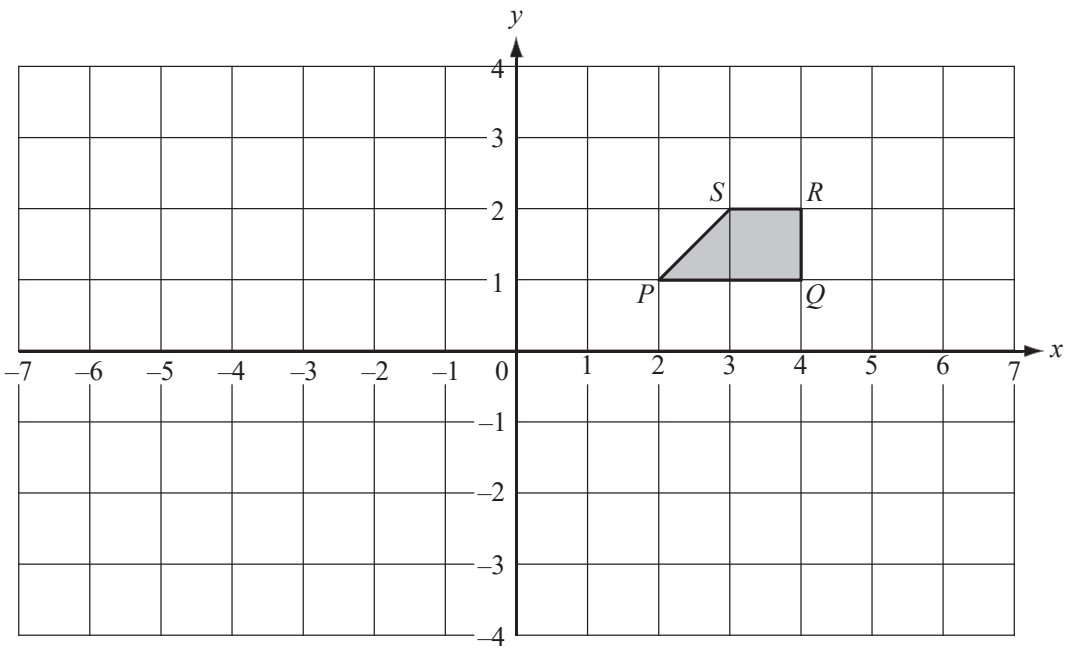


(a) Describe the single transformation which maps $ABCD$ onto $A'B'C'D'$. [3]

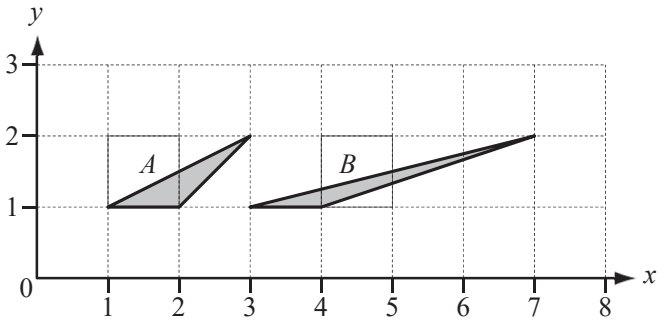
(b) A single transformation maps $A'B'C'D'$ onto $A''B''C''D''$. [2]
Find the matrix which represents this transformation.

$$\mathbf{A} = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix} \qquad \mathbf{B} = \begin{pmatrix} 0 & -1 \\ -1 & 0 \end{pmatrix}$$

On the grid on the next page, draw the image of $PQRS$ after the transformation represented by $\mathbf{BA}$.



[5]

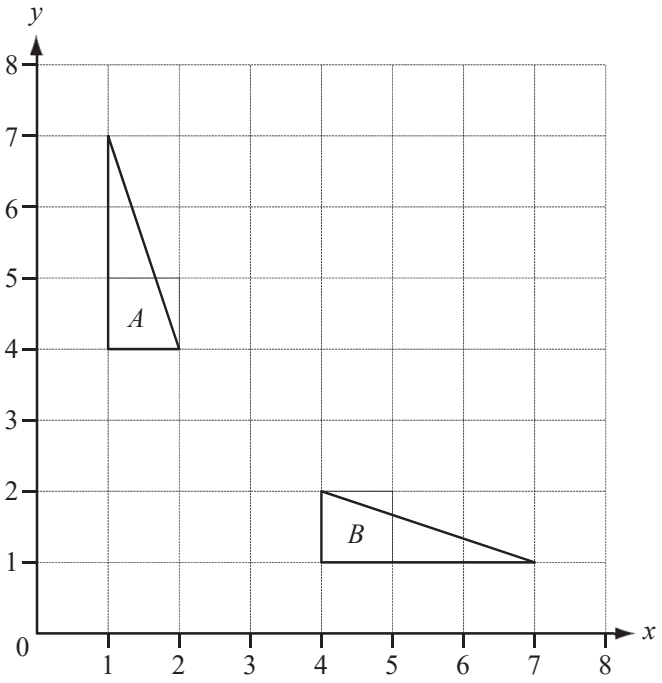


(a) Describe fully the single transformation that maps triangle A onto triangle B.

[3]

(b) Find the 2×2 matrix which represents this transformation.

[2]



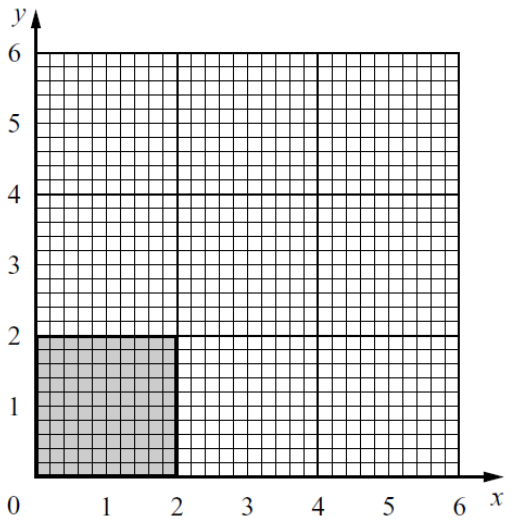
(a) Describe fully the **single** transformation which maps triangle A onto triangle B.

[2]

(b) On the grid, draw the image of triangle A after rotation by 90° clockwise about the point (4, 4).

[2]

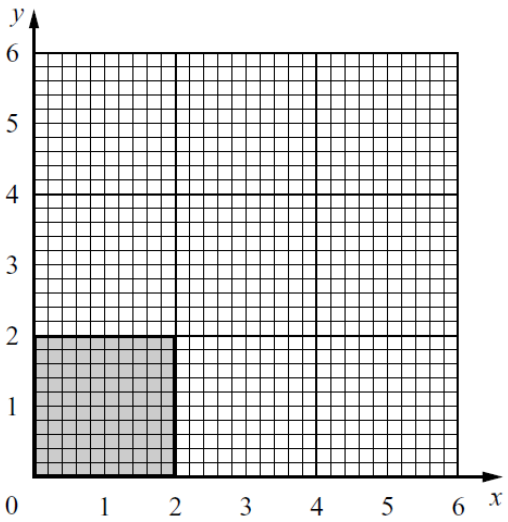
(a)



Draw the shear of the shaded square with the x-axis invariant and the point $(0, 2)$ mapping onto the point $(3, 2)$.

[2]

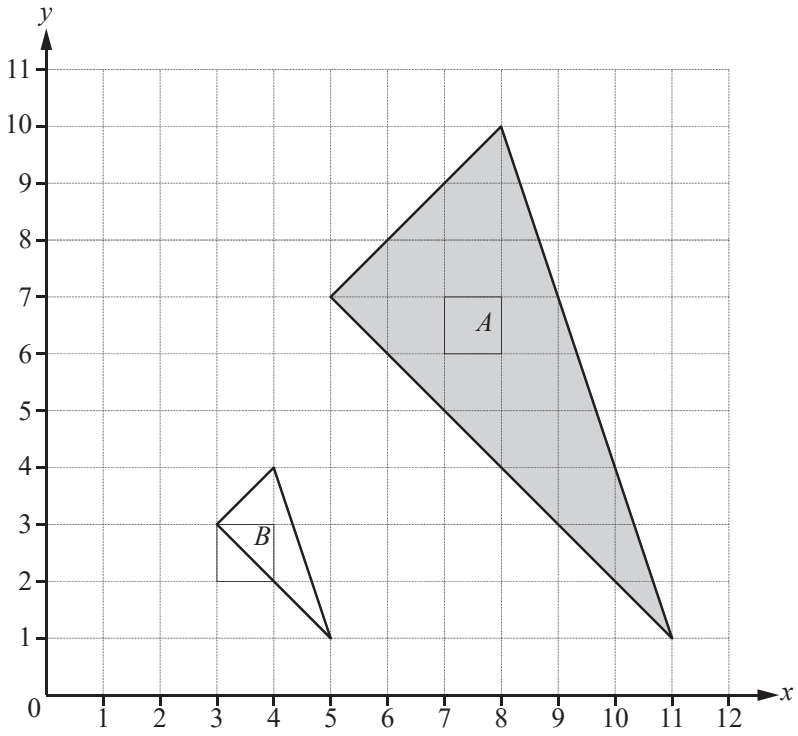
(b)



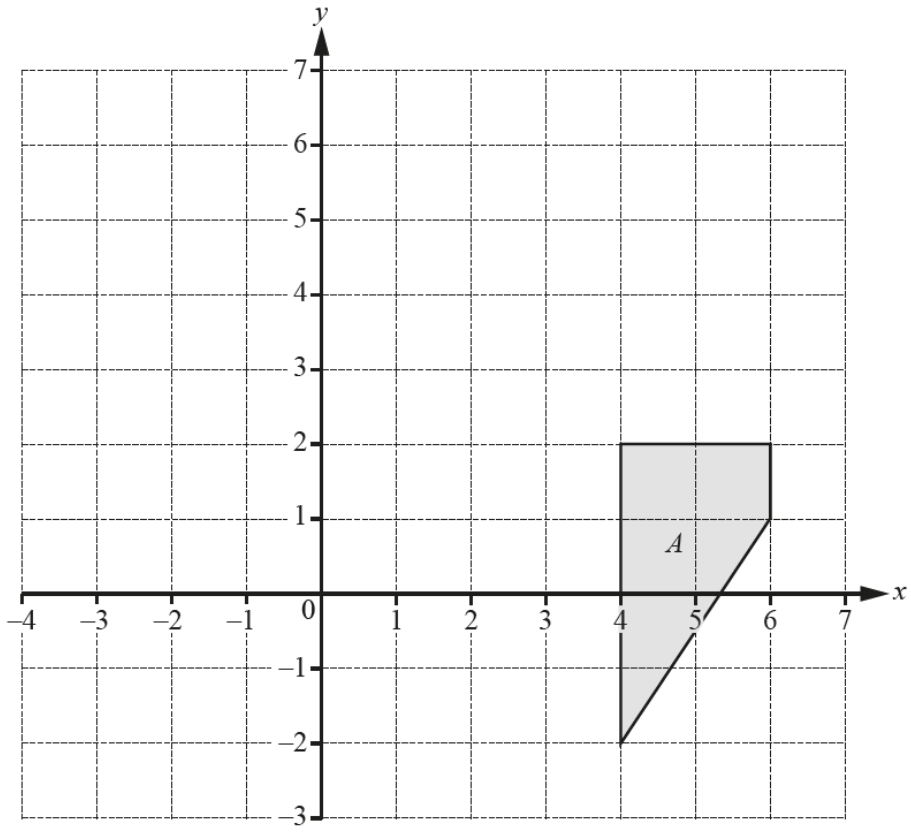
(i) Draw the one-way stretch of the shaded square with the x-axis invariant and the point $(0, 2)$ mapping onto the point $(0, 6)$.

[2]

(ii) Write down the matrix of this stretch. [1]



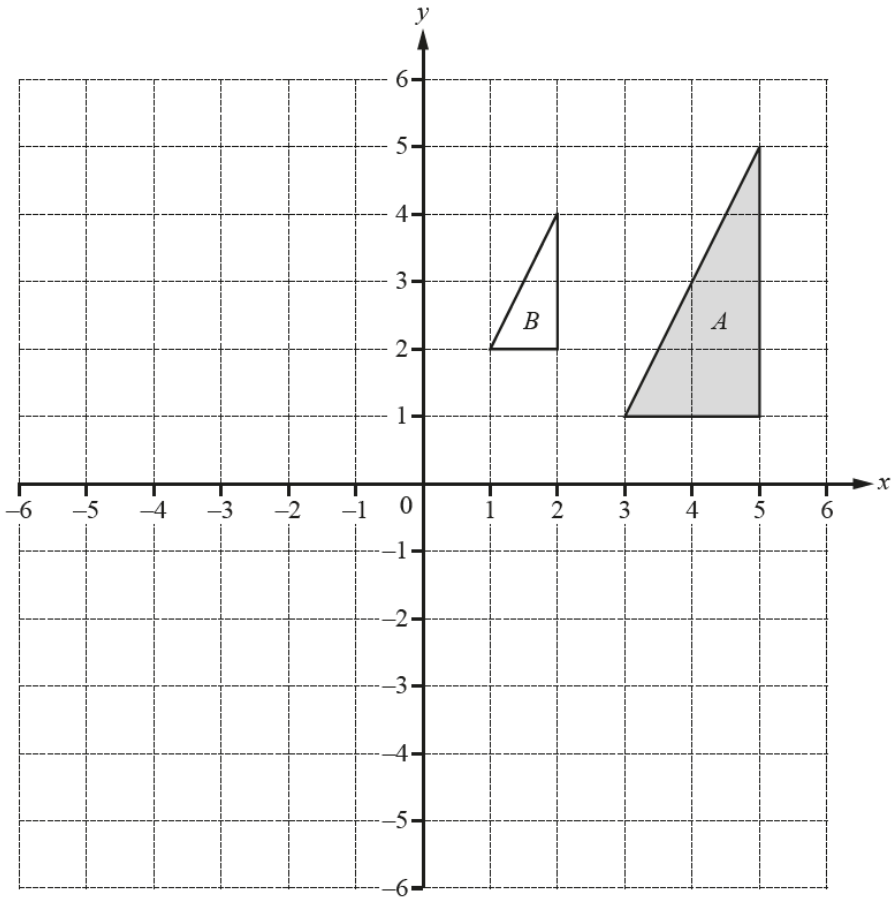
Describe fully the **single** transformation that maps triangle A onto triangle B. [3]



T(X) is the image of the shape X after translation by the vector $\begin{pmatrix} -1 \\ 3 \end{pmatrix}$.

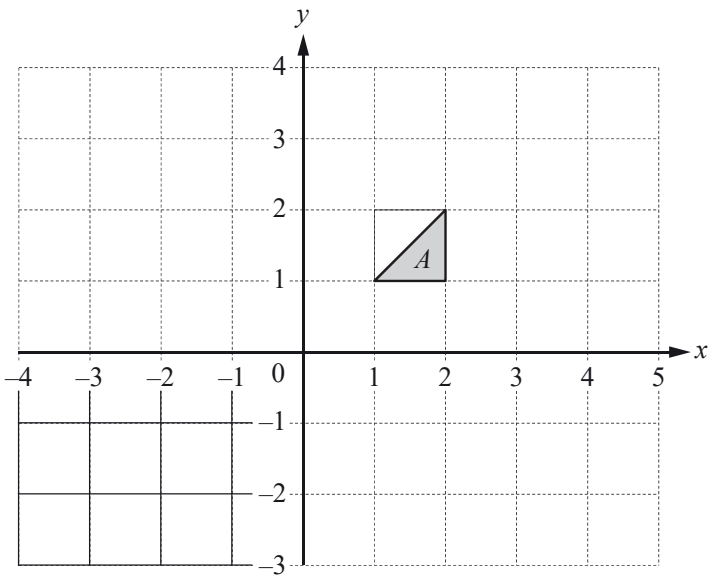
M(Y) is the image of the shape Y after reflection in the line $x = 2$.

On the grid, draw MT(A), the image of shape A after the transformation MT. [3]

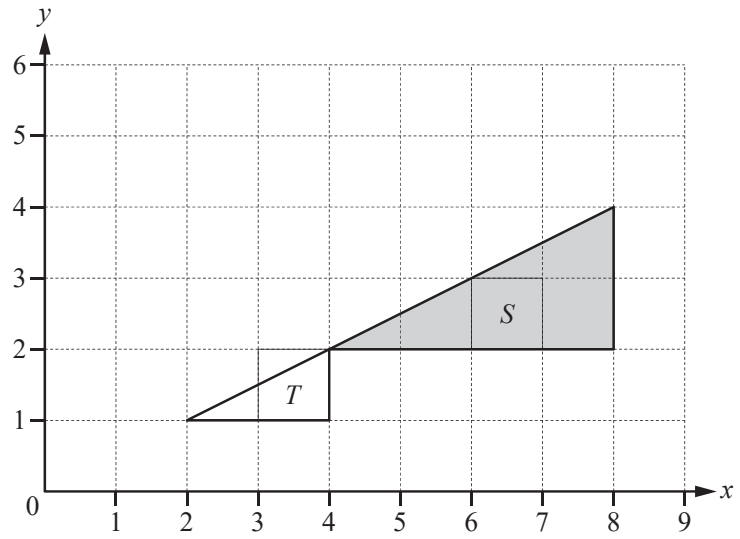


(a) Describe fully the **single** transformation that maps triangle A onto triangle B. [3]

Question 10



Draw the image of shape A after a translation by the vector $\begin{pmatrix} 2 \\ -3 \end{pmatrix}$. [2]



(a) Describe fully the **single** transformation that maps triangle S onto triangle T. [3]

(b) Find the matrix which represents the transformation that maps triangle S onto triangle T. [2]

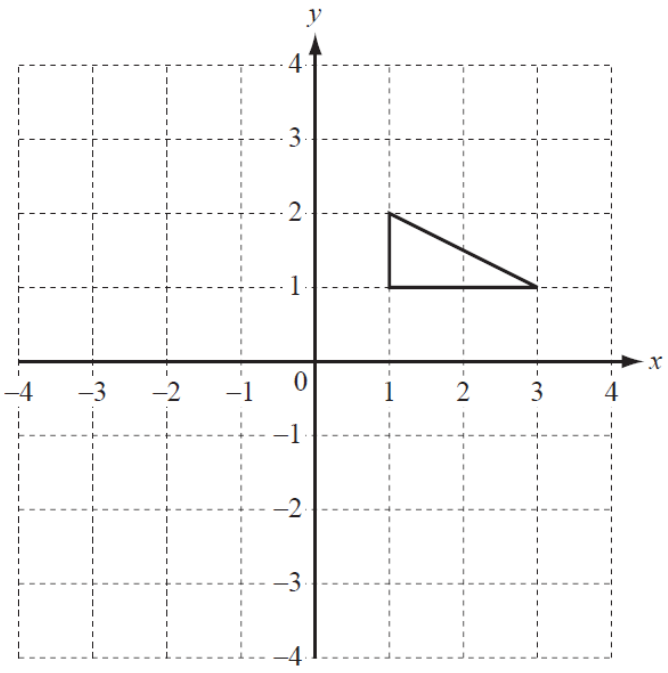
Question 12

Find the 2×2 matrix that represents a rotation through $90°$ clockwise about $(0, 0)$. [2]

(p, q) is the image of the point (x, y) under this combined transformation.

$$\begin{pmatrix} p \\ q \end{pmatrix} = \begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} + \begin{pmatrix} 3 \\ 2 \end{pmatrix}$$

(a) Draw the image of the triangle under the combined transformation. [3]



(b) Describe fully the **single** transformation represented by $\begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix}$. [2]