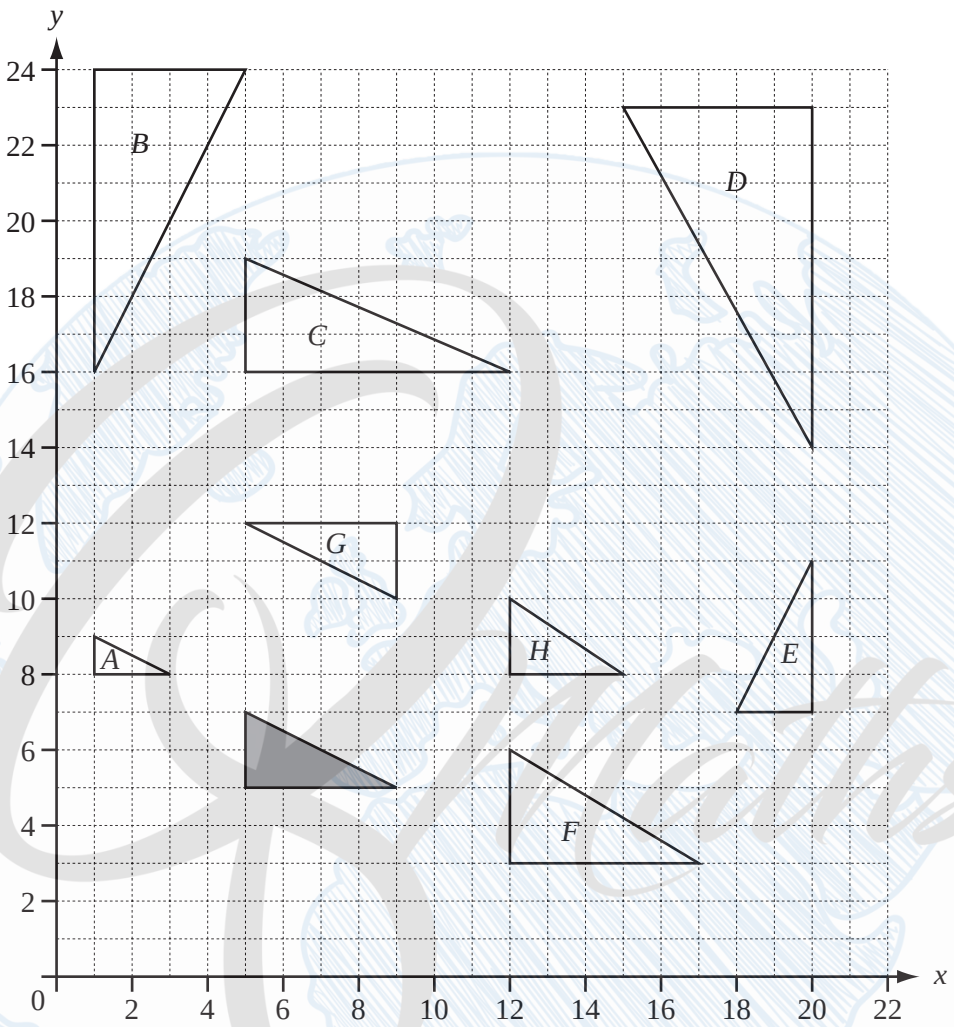
Transformations

18



Write down the letters of all the triangles which are

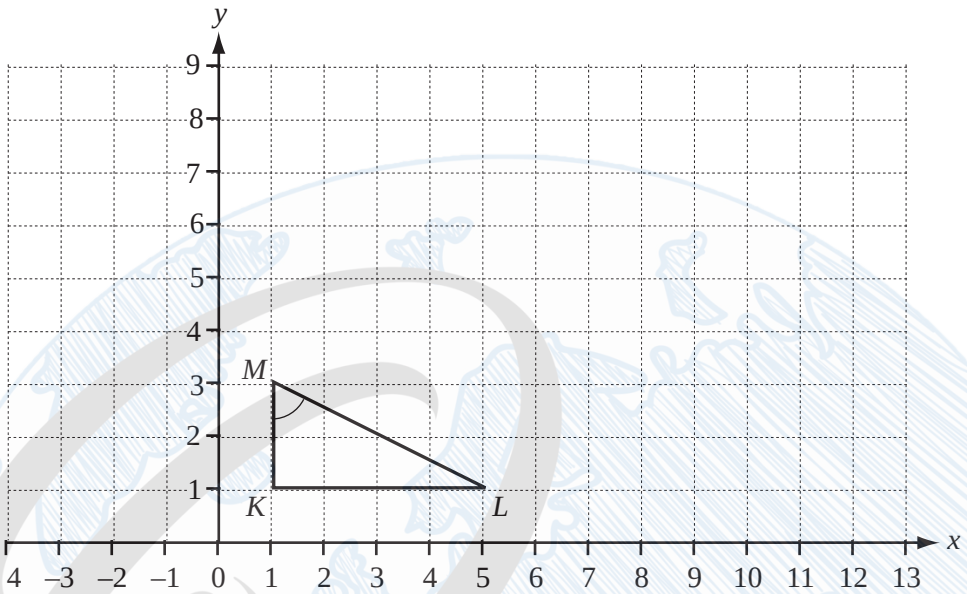
(a) congruent to the shaded triangle,

Answer(a) ..... [2]

(b) similar, but not congruent, to the shaded triangle.

Answer(b) ..... [2]

20



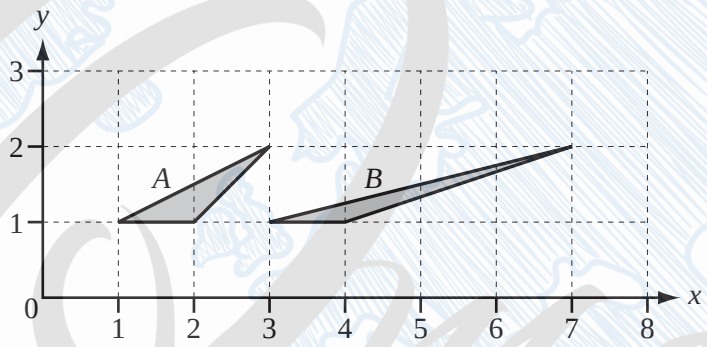
The triangle KLM is shown on the grid.

(a) Calculate angle KML

Answer(a) Angle KML = ... [2]

(b) On the grid, draw the shear of triangle KLM, with a shear factor of 3 and the x-axis invariant. [2]

14



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

Answer(a) ..... [3]

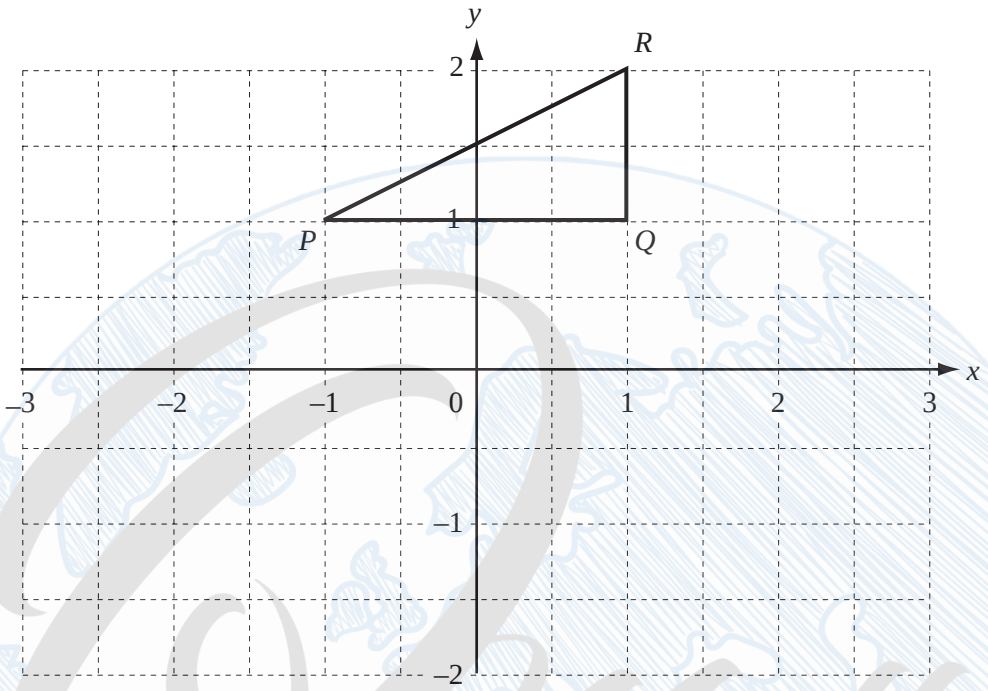
(b) Find the 2 × 2 matrix which represents this transformation.

Answer(b) ( ) [2]

13 Find the matrix which represents the combined transformation of a reflection in the x axis **followed by** a reflection in the line $y = x$.

Answer $\begin{pmatrix} & \\ & \end{pmatrix}$ [3]

21



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

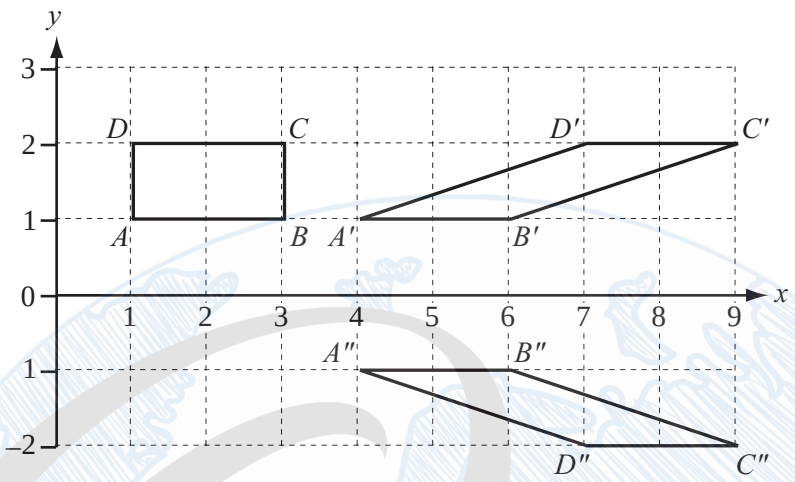
(a) Rotate triangle PQR by 90° clockwise about (0, 0).
Label your image $PQ'R'$. [2]

(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 $P''Q''R''$.

Answer(c) ..... [2]

17



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

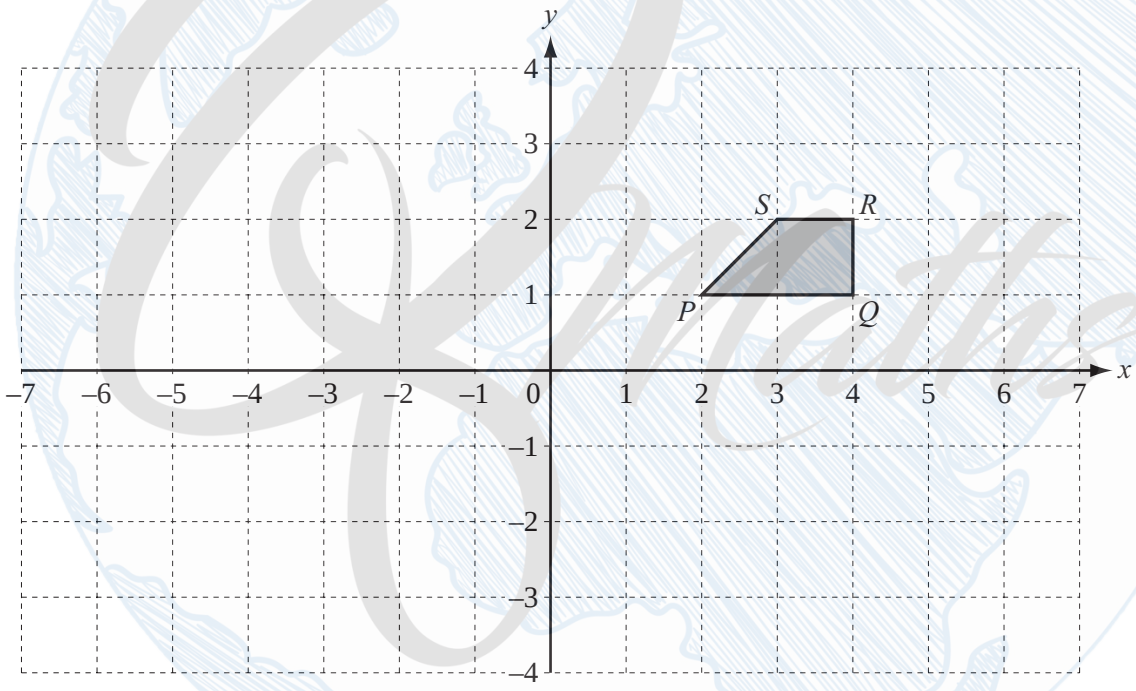
Answer(a) ..... [3]

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

Answer(b) $\begin{pmatrix} & \\ & \end{pmatrix}$ [2]

18 $\mathbf{A} = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$ $\mathbf{B} = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$

On the grid on the next page, draw the image of *PQRS* after the transformation represented by **BA**.

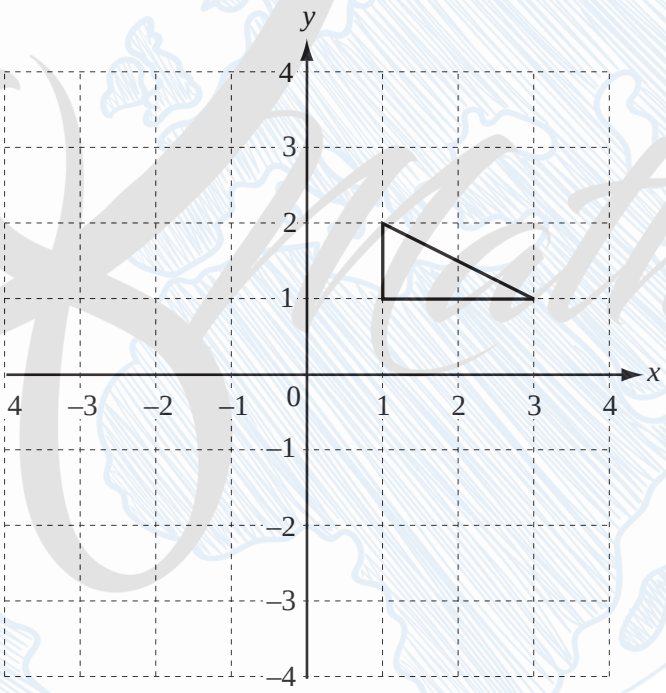


[5]

17 (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.

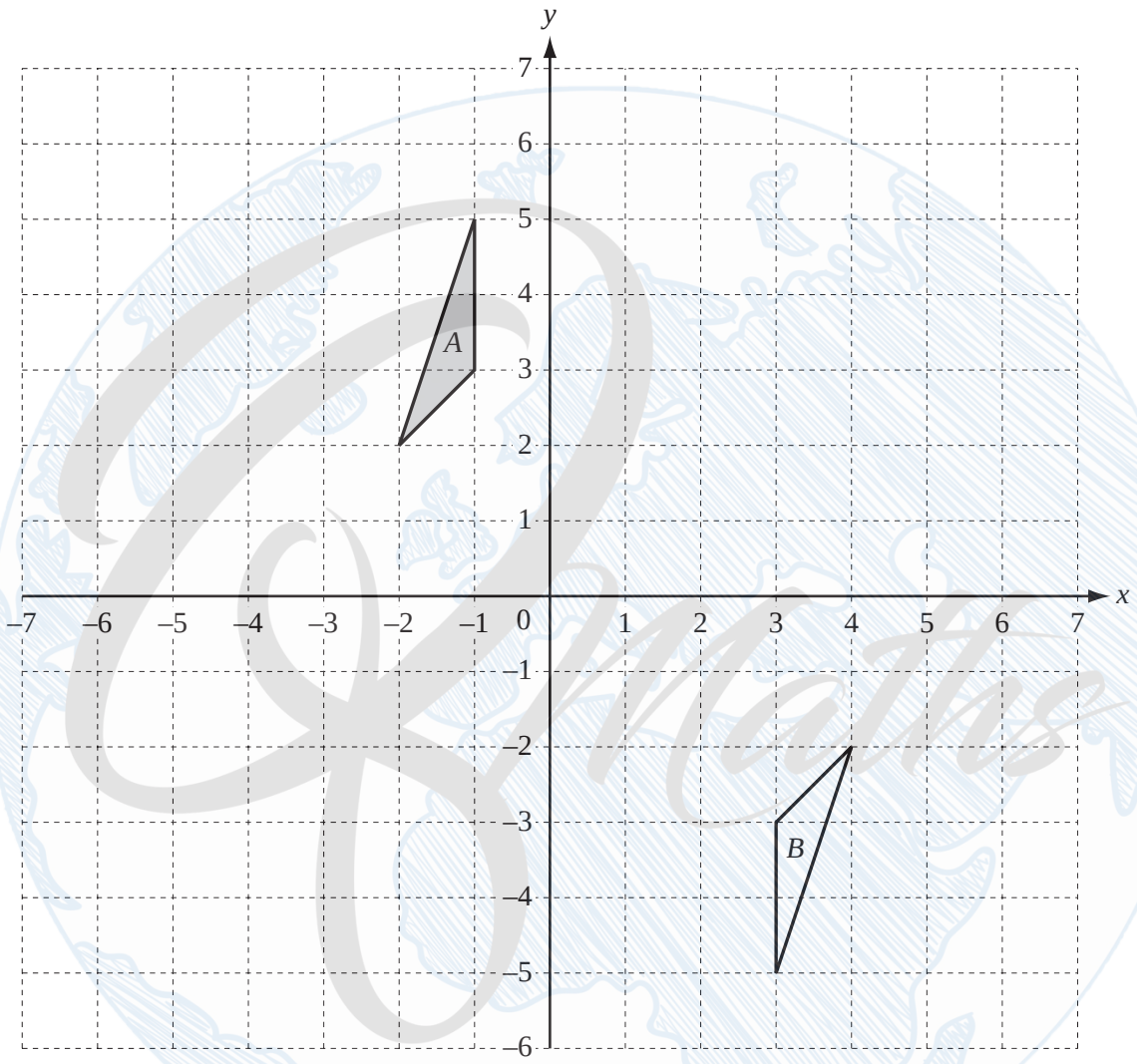


[3]

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

Answer (b) ..... [2]

22



(a) Draw the image of triangle *A* after a translation by the vector $\begin{pmatrix} 3 \\ -4 \end{pmatrix}$. [2]

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

Answer(b) .....

..... [3]

(c) Draw the image of triangle *A* after the transformation represented by the matrix $\begin{pmatrix} -2 & 0 \\ 0 & 1 \end{pmatrix}$. [3]

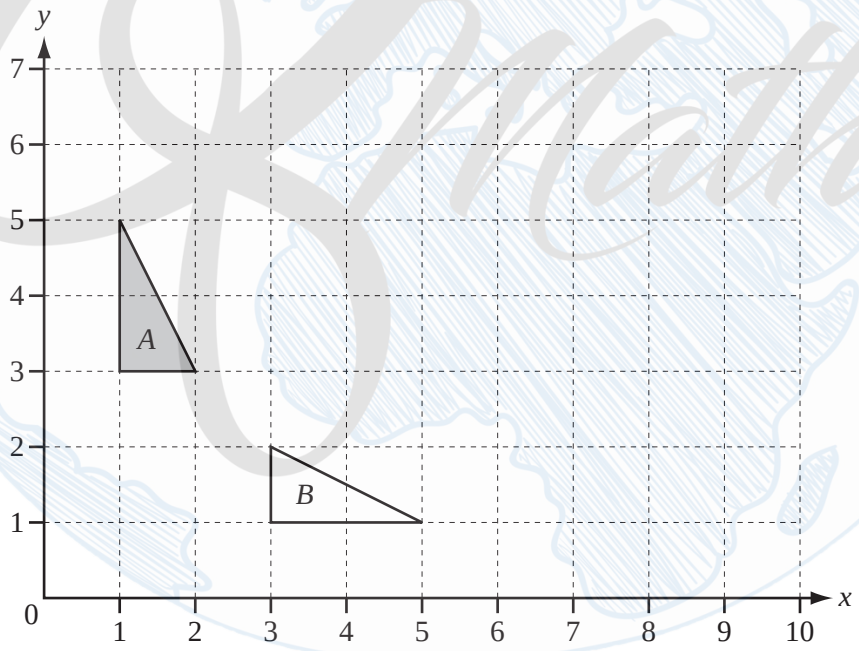
19 **(a)** $\mathbf{N} = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$

Describe fully the **single** transformation represented by **N**.

Answer(a) .....

..... [3]

(b) Find the matrix which represents the **single** transformation that maps triangle *A* onto triangle *B*.



Answer(b) $\begin{pmatrix} & \\ & \end{pmatrix}$ [2]

(c) On the grid, draw the image of triangle *A* under a stretch, factor 3, with the *y*-axis invariant. [2]

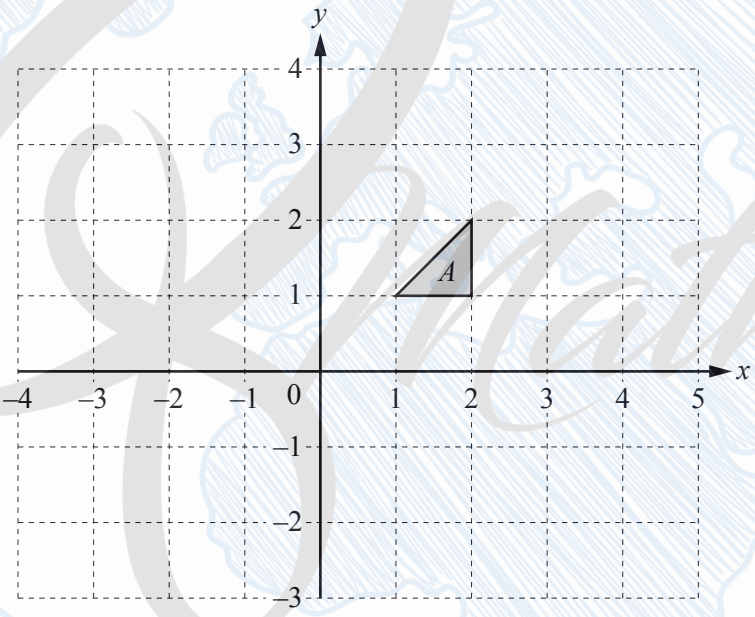
11) June 2015 V3

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

Answer $\begin{pmatrix} & \\ & \end{pmatrix}$ [2]

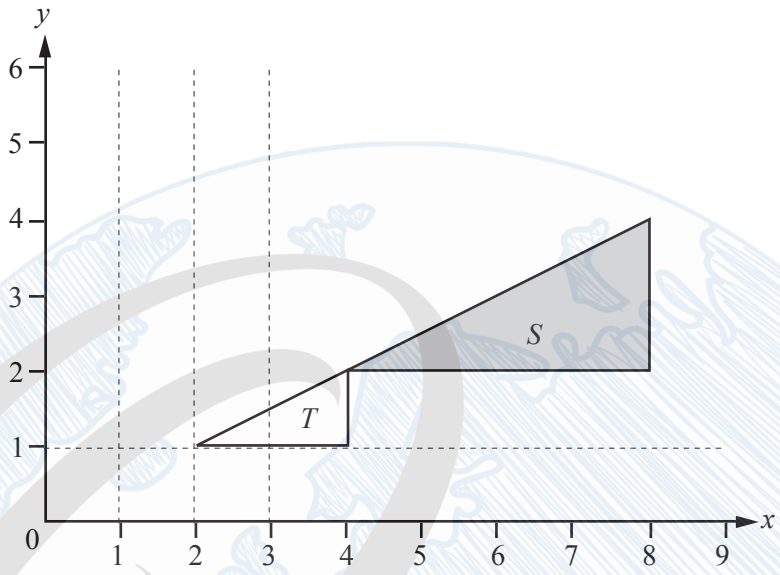
12) November 2015 V1

3



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

17



(a) Describe fully the **single** transformation that maps triangle S onto triangle T

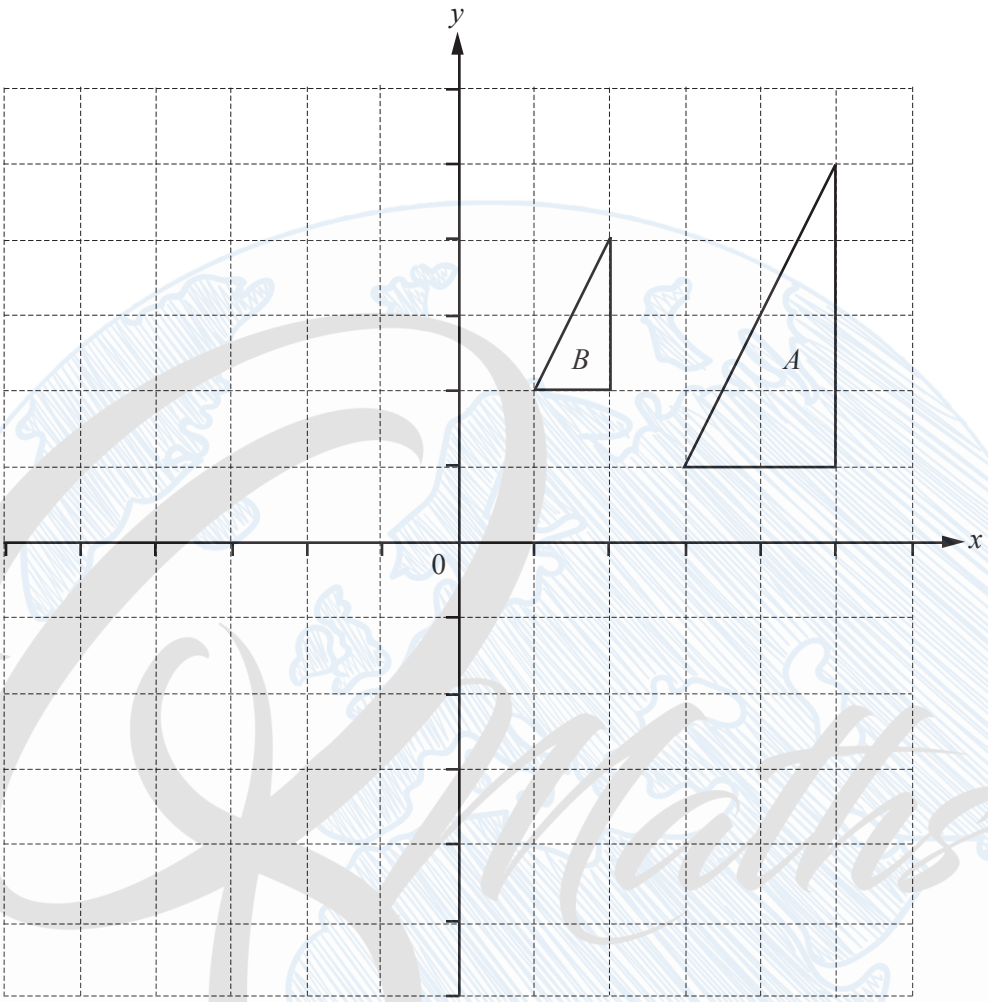
Answer(a) .....

[3]

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

Answer(b) $\begin{pmatrix} & \\ & \end{pmatrix}$ [2]

18



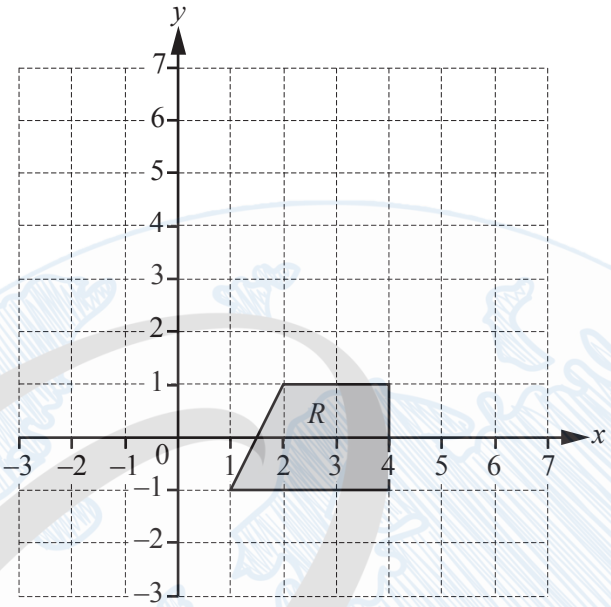
(a) Describe fully the **single** transformation that maps triangle A onto triangle B

.....

..... [3]

(b) Draw the image of triangle A after the transformation represented by $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$. [3]

16



On the grid, draw the image of shape R after the transformation represented by the matrix $\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$. [3]