# IGCSE Transformations – 1

Oct 01 Paper 4



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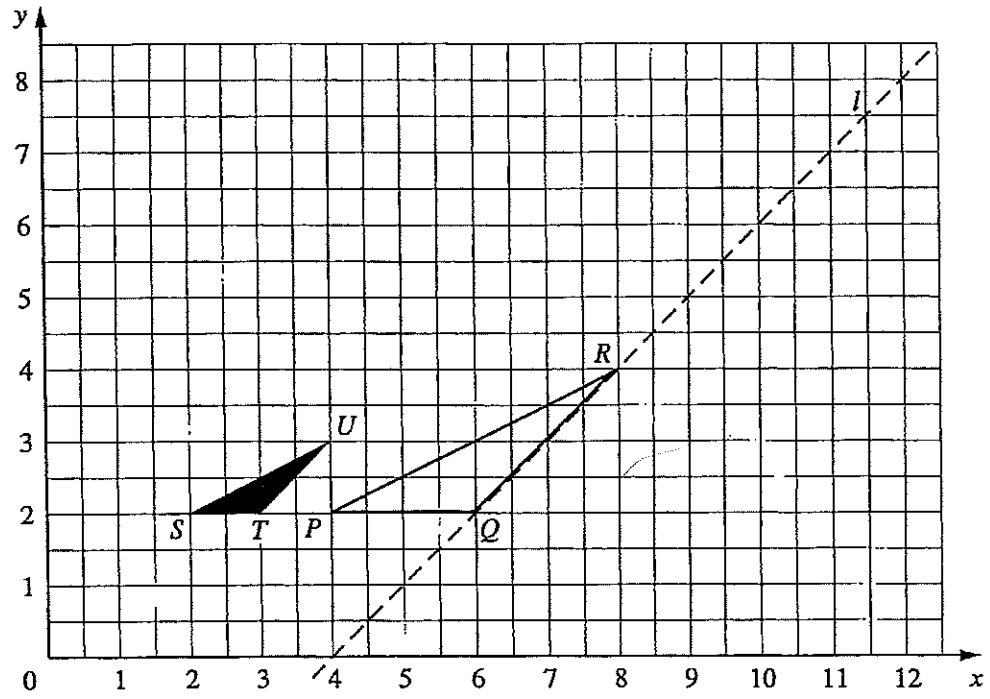


**You do not need to copy this diagram.**

The coordinates of $P$, $Q$ and $R$ are (4, 2), (6, 2) and (8, 4) respectively.

The points $Q$ and $R$ lie on the line $l$.

(a) Find the new coordinates for

(i) $P$, after reflection in the line $l$, [2]

(ii) $Q$, after translation by the vector $\begin{pmatrix} -1 \\ 3 \end{pmatrix}$, [2]

(iii) $R$, after a rotation of 90° anticlockwise about centre $P$. [2]

(b) The coordinates of $S$, $T$ and $U$ are (2, 2), (3, 2) and (4, 3) respectively.

(i) Describe fully the single transformation which maps triangle $PQR$ onto the shaded triangle $STU$. [3]

(ii) Find, in the form $1 : n$, the ratio area of triangle $STU$ : area of triangle $PQR$. [2]

(c) Find the new area of triangle $PQR$ when it is stretched parallel to the $y$-axis with scale factor 3 and the $x$-axis invariant. [2]

(d) (i) Find the inverse of the matrix $\begin{pmatrix} 2 & 3 \\ -1 & 1 \end{pmatrix}$. [2]

(ii) A point $W$ has coordinates $(x, y)$ such that $\begin{pmatrix} 2 & 3 \\ -1 & 1 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 6 \\ 2 \end{pmatrix}$.

Find the coordinates of $W$. [3]