Reflection and Rotation Matrices

A triangle with coordinates (3,2), (5,2) and (3,6) is transformed by the matrix $\begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix}$. By pre-multiplying, find the coordinates of the transformed triangle. Draw this transformation on a grid and hence describe it fully.

$(3,2) \rightarrow (-3,2)$
$(5,2) \rightarrow (-5,2)$
$(3,6) \rightarrow (-3,6)$
Reflection in y-axis

A triangle with coordinates (-3,2), (-5,2) and (-3,5) is transformed by the matrix $\begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$. By pre-multiplying, find the coordinates of the transformed triangle. Draw this transformation on a grid and hence describe it fully.

$(-3,2) \rightarrow (2,3)$
$(-5,2) \rightarrow (2,5)$
$(-3,5) \rightarrow (5,3)$
Rotation 90° clockwise about origin

A triangle with coordinates (2,3), (4,3) and (4,7) is transformed by the matrix $\begin{pmatrix} 0 & -1 \\ -1 & 0 \end{pmatrix}$. By pre-multiplying, find the coordinates of the transformed triangle. Draw this transformation on a grid and hence describe it fully.

$(2,3) \rightarrow (-3,-2)$
$(4,3) \rightarrow (-3,-4)$
$(4,7) \rightarrow (-7,-4)$
Reflection in the line $y=-x$

A triangle with coordinates (3,1), (5,1) and (3,5) is transformed by the matrix $\begin{pmatrix} -1 & 0 \\ 0 & -1 \end{pmatrix}$. By pre-multiplying, find the coordinates of the transformed triangle. Draw this transformation on a grid and hence describe it fully.

$(3,1) \rightarrow (-3,-1)$
$(5,1) \rightarrow (-5,-1)$
$(3,5) \rightarrow (-3,-5)$
Rotation 180° about the origin

The transformation matrix $\begin{pmatrix} a & 2 \\ -1 & 1 \end{pmatrix}$ maps the point $(3, 4)$ onto the point $(2, b)$. Work out the values of a and b.

$$\begin{pmatrix} a & 2 \\ -1 & 1 \end{pmatrix}\begin{pmatrix} 3 \\ 4 \end{pmatrix} = \begin{pmatrix} 2 \\ b \end{pmatrix}$$

$3a+8=2$
$-3+4=b$

$a=-2$
$b=1$