

Worksheet
Application of Matrices in Geometric Transformation

1. The transformation matrix $\begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$ maps the point P to Q. The transformation matrix $\begin{pmatrix} 2 & 1 \\ -1 & 0 \end{pmatrix}$ maps the point Q to R. The point P is (-1, 3).

Answer the following questions.

- a. What is the matrix of the combination transformation?

$\begin{pmatrix} & \\ & \end{pmatrix}$

- b. Work out the coordinates of point R.

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2. Line $2x + y - 1 = 0$ is transformed by matrix $\begin{pmatrix} 1 & 1 \\ 1 & 2 \end{pmatrix}$, followed by a reflection over x-axis. Determine the equation of the image of line.

3. P(x, y) is transformed by the matrix $\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$, followed by further transformation by matrix $\begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$. Work out the matrix for the combined transformation.

$\begin{pmatrix} & \\ & \end{pmatrix}$