

Harder Transformations Using Matrices

(a)	(b)	(c)
<p>Find the single matrix that represents an enlargement about the origin with scale factor 3, followed by a rotation of 90° clockwise about the origin.</p> $\begin{pmatrix} 0 & 3 \\ -3 & 0 \end{pmatrix}$	<p>Find the single matrix that represents a reflection in the y-axis, followed by a rotation of 180° about the origin.</p> $\begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$	$P = \begin{pmatrix} 3 & 1 \\ 0 & -1 \end{pmatrix} \quad Q = \begin{pmatrix} 0 & 2 \\ 1 & -1 \end{pmatrix}$ <p>Matrices P and Q represent different transformations. Find the single matrix that represents transformation P followed by transformation Q.</p> $\begin{pmatrix} 0 & -2 \\ 3 & 2 \end{pmatrix}$
(d)	(e)	(f)
<p>The point P $(4, -2)$ is mapped to the point Q following a reflection in the line $y = x$, then an enlargement with scale factor 2 about the origin. Use matrix algebra to find the coordinates of point Q.</p> $(-4, 8)$	<p>The point (a, b) is mapped to the point $(-5, 1)$ following a rotation of 180° about the origin, then a reflection in the x-axis. Using matrix algebra, find the coordinates (a, b).</p> $(5, 1)$	<p>The matrix $\begin{pmatrix} 0 & b \\ -2 & 4 \end{pmatrix}$ maps the point $(a, -3)$ onto the point $(-9, 5)$. Use matrix algebra to find the values of a and b.</p> $a = -8, b = 3$
(g)	(h)	(i)
<p>The transformation matrix $\begin{pmatrix} a & 2b \\ -a & 3 \end{pmatrix}$ maps the point $(2, -1)$ to the point $(6, 7)$. Find the values of a and b.</p> $a = -5, b = -8$	<p>The transformation matrix $\begin{pmatrix} b & 2a \\ a & -b \end{pmatrix}$ maps the point $(6, 3)$ to the point $(24, b)$. Find the values of a and b.</p> $a = 2, b = 3$	<p>Point $(c, 4)$ is mapped to the point $(-2, d)$ by the transformation matrix $\begin{pmatrix} c & -3 \\ 2 & -1 \end{pmatrix}$. Use matrix algebra to find the two possible values of c and d.</p> $c = 3, d = 2$ <p style="text-align: center;"><i>or</i></p> $c = -3, d = -10$