Harder Transformations Using Matrices

(a)	(b)	(c)
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.	Find the single matrix that represents a reflection in the y-axis, followed by a rotation of $180°$ about the origin.	$P = \begin{pmatrix} 3 & 1 \\ 0 & -1 \end{pmatrix}$ $Q = \begin{pmatrix} 0 & 2 \\ 1 & -1 \end{pmatrix}$ Matrices P and Q represent different transformations. Find the single matrix that represents transformation P followed by transformation Q.
(d)	**(e)**	**(f)**
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.	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).	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.
(g)	**(h)**	**(i)**
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.	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.	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.