|  |
| --- |
| **Rotations Using Matrices** |
| **(a)** | **(b)** | **(c)** |
| By considering the unit square, determine the matrix which describes a rotation $90°$ clockwise about the origin.  | Describe fully the single transformation represented by the matrix $\left(\begin{matrix}0&-1\\1&0\end{matrix}\right)$  | By considering the unit square, determine the matrix which describes a rotation $180°$ about the origin. |
| **(d)** | **(e)** | **(f)** |
| The point $(1, -6)$ is mapped onto the point $(a, b)$ when rotated $90°$ anti-clockwise about the origin. Using matrix algebra, find the values of $a$ and $b$. | The point $(c, d)$ is mapped onto the point $(2, 4)$ when rotated $270°$ anti-clockwise about the origin. Using matrix algebra, find the values of $c$ and $d$. | A triangle with vertices at $(1, 1)$, $(5, 2)$ and $(4, -1)$ is rotated $180°$ about the origin. Use matrix algebra to find the coordinates of the vertices of the rotated triangle. |
| **(g)** | **(h)** | **(i)** |
| Use matrix algebra to show that a rotation of $90°$ clockwise about the origin, followed by a rotation of $180°$ is equivalent to a rotation of $90°$ anti-clockwise about the origin. | The point $(a, 6)$ is mapped onto the point $(b, -4)$ following a rotation of $90°$ anti-clockwise about the origin. Use matrix algebra to find the values of $a$ and $b$. | The point $(x, 2y+6)$ is mapped onto the point $(2x, y-7)$ following a rotation of $90°$ clockwise about $(0, 0)$ . Use matrix algebra to find the values of $x$ and $y$. |