1 The matrix **M** represents the sequence of two transformations in the x-y plane given by a stretch parallel to the x-axis, scale factor 14, followed by a rotation anticlockwise about the origin through angle $\frac{1}{3}\pi$.

(a) Show that $2\mathbf{M} = \begin{pmatrix} 14 & -\sqrt{3} \\ 14\sqrt{3} & 1 \end{pmatrix}$. [4]

(b) Find the equations of the invariant lines, through the origin, of the transformation in the x-y plane represented by **M**. [5]

The unit square S in the x-y plane is transformed by **M** onto the rectangle P.

(c) Find the matrix which transforms P onto S. [2]