

1.

$$\mathbf{P} = \frac{1}{2} \begin{pmatrix} 1 & \sqrt{3} \\ -\sqrt{3} & 1 \end{pmatrix} \quad \mathbf{Q} = \begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix}$$

The matrices \mathbf{P} and \mathbf{Q} represent linear transformations, P and Q respectively, of the plane.

The linear transformation M is formed by first applying P and then applying Q .

(a) Find the matrix \mathbf{M} that represents the linear transformation M .

(2)

(b) Show that the invariant points of the linear transformation M form a line in the plane, stating the equation of this line.

(3)