

FP1 Transformations Questions

- 7 (a) The transformation T is defined by the matrix \mathbf{A} , where

$$\mathbf{A} = \begin{bmatrix} 0 & -1 \\ -1 & 0 \end{bmatrix}$$

- (i) Describe the transformation T geometrically. *(2 marks)*
- (ii) Calculate the matrix product \mathbf{A}^2 . *(2 marks)*
- (iii) Explain briefly why the transformation T followed by T is the identity transformation. *(1 mark)*
- (b) The matrix \mathbf{B} is defined by

$$\mathbf{B} = \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$$

- (ii) Calculate $(\mathbf{B} + \mathbf{A})(\mathbf{B} - \mathbf{A})$. *(3 marks)*
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- 5 The matrix \mathbf{M} is defined by

$$\mathbf{M} = \begin{bmatrix} \frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} \\ -\frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} \end{bmatrix}$$

- (b) Describe fully the geometrical transformation represented by \mathbf{M} . *(2 marks)*
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- 2 The matrices \mathbf{A} and \mathbf{B} are given by

$$\mathbf{A} = \begin{bmatrix} \frac{\sqrt{3}}{2} & -\frac{1}{2} \\ \frac{1}{2} & \frac{\sqrt{3}}{2} \end{bmatrix}, \quad \mathbf{B} = \begin{bmatrix} \frac{\sqrt{3}}{2} & \frac{1}{2} \\ \frac{1}{2} & -\frac{\sqrt{3}}{2} \end{bmatrix}$$

(b) Describe fully the geometrical transformation represented by each of the following matrices:

(i) \mathbf{A} ; (2 marks)

(ii) \mathbf{B} ; (2 marks)

(iii) \mathbf{BA} . (2 marks)

1 The matrices \mathbf{A} and \mathbf{B} are given by

$$\mathbf{A} = \begin{bmatrix} 2 & 1 \\ 3 & 8 \end{bmatrix}, \quad \mathbf{B} = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$$

The matrix $\mathbf{M} = \mathbf{A} - 2\mathbf{B}$.

(a) Show that $\mathbf{M} = n \begin{bmatrix} 0 & -1 \\ -1 & 0 \end{bmatrix}$, where n is a positive integer. (2 marks)

(b) The matrix \mathbf{M} represents a combination of an enlargement of scale factor p and a reflection in a line L . State the value of p and write down the equation of L . (2 marks)
