AQA – Matrices – AS Further Mathematics P1

1. June/2021/Paper_7366/1/No.3

The matrix **M** represents a rotation about the x-axis.

$$\mathbf{M} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & a & \frac{\sqrt{3}}{2} \\ 0 & b & -\frac{1}{2} \end{bmatrix}$$

Which of the following pairs of values is correct?

Tick (✓) **one** box.

[1 mark]

$a = \frac{1}{2}$ and $b = \frac{\sqrt{3}}{2}$ ☐

$a = \frac{1}{2}$ and $b = -\frac{\sqrt{3}}{2}$ ☐

$a = -\frac{1}{2}$ and $b = \frac{\sqrt{3}}{2}$ ☐

$a = -\frac{1}{2}$ and $b = -\frac{\sqrt{3}}{2}$ ☐

2. June/2021/Paper_7366/1/No.4

The point $(2, -1)$ is invariant under the transformation represented by the matrix **N**

Which of the following matrices could be **N**?

Circle your answer.

[1 mark]

$\begin{bmatrix} 4 & 6 \\ 2 & 5 \end{bmatrix}$ $\begin{bmatrix} 6 & 5 \\ 4 & 2 \end{bmatrix}$ $\begin{bmatrix} 5 & 2 \\ 6 & 4 \end{bmatrix}$ $\begin{bmatrix} 2 & 4 \\ 5 & 6 \end{bmatrix}$

3. June/2021/Paper_7366/1/No.10

Matrix **A** is given by

$$\mathbf{A} = \begin{bmatrix} 3 & \mathrm{i} - 1 \\ \mathrm{i} & 2 \end{bmatrix}$$

(a) Show that $\det \mathbf{A} = a + \mathrm{i}$ where a is an integer to be determined.

[2 marks]

(b) Matrix **B** is given by

$$\mathbf{B} = \begin{bmatrix} 14 - 2\mathrm{i} & b \\ c & d \end{bmatrix} \quad \text{and} \quad \mathbf{AB} = p\mathbf{I}$$

where $b, c, d \in \mathbb{C}$ and $p \in \mathbb{N}$

Find b, c, d and p

[6 marks]