Matrices – 2022 GCE Pure Core 1 Further Math A Y540

1. June/2022/Paper_ Y540/01/No.2

The matrix $\mathbf{A}$ is given by $\mathbf{A} = \begin{pmatrix} 2 & -2 \\ 1 & 3 \end{pmatrix}$.

(a) Calculate $\det \mathbf{A}$. **[1]**

(b) Write down $\mathbf{A}^{-1}$. **[1]**

(c) Hence solve the equation $\mathbf{A}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -1 \\ 2 \end{pmatrix}$. **[2]**

(d) Write down the matrix $\mathbf{B}$ such that $\mathbf{AB} = 4\mathbf{I}$. **[1]**

Matrices $\mathbf{C}$ and $\mathbf{D}$ are given by $\mathbf{C} = \begin{pmatrix} 2 \\ 0 \\ 1 \end{pmatrix}$ and $\mathbf{D} = (0 \quad 2 \quad p)$ where p is a constant.

(e) Find, in terms of p,

- the matrix $\mathbf{CD}$
- the matrix $\mathbf{DC}$. **[3]**

It is observed that $\mathbf{CD} \neq \mathbf{DC}$.

(f) The result that $\mathbf{CD} \neq \mathbf{DC}$ is a counter example to the claim that matrix multiplication has a particular property. Name this property. **[1]**