

Let M be an invertible matrix of dimension $2n \times 2n$, represented in block form as

$$M = \begin{bmatrix} A & B \\ C & D \end{bmatrix} \quad \text{and} \quad M^{-1} = \begin{bmatrix} E & F \\ G & H \end{bmatrix}.$$

Show that $\det M \cdot \det H = \det A$.