[gex42] Matrix operations III: inverse square matrix

Consider the constant square matrix,

$$\mathbf{N} = \begin{pmatrix} 2 & 1 & 1 \\ 3 & 2 & 5 \\ 1 & 4 & 2 \end{pmatrix}.$$

(a) Calculate the inverse matrix $\mathbf{N}^{-1}$ via the Inverse command of Mathematica.
(b) Verify the identity $\mathbf{N}\mathbf{N}^{-1} = \mathbf{N}^{-1}\mathbf{N} = \mathbf{I}$.
(c) Verify the identity $\mathrm{Det}[\mathbf{N}^{-1}] = 1/\mathrm{Det}[\mathbf{N}]$.
(d) Calculate the inverse matrix $\mathbf{N}^{-1}$ from the determinant $\mathrm{Det}[\mathbf{N}]$ and the cofactor matrix $\mathbf{N}_{ij}$ as explained in [gmd6]:

$$\mathbf{N}^{-1} = \frac{(\mathbf{N}_{ij})^T}{\mathrm{Det}[\mathbf{N}]}.$$

Create a Mathematica notebook to carry out these tasks.

Solution: