6E Inverse of 3×3 Matrices

1. Given that the Matrix $\boldsymbol{A} = \begin{bmatrix} 1 & 3 & 1 \\ 0 & 4 & 1 \\ 2 & -1 & 0 \end{bmatrix}$, find $\boldsymbol{A}^{-1}$

2. The matrices $\boldsymbol{P}$ and $\boldsymbol{Q}$ are non-singular. Prove that $(\boldsymbol{PQ})^{-1} = \boldsymbol{Q}^{-1}\boldsymbol{P}^{-1}$.

3. The matrix $\boldsymbol{A} = \begin{bmatrix} -2 & 3 & -3 \\ 0 & 1 & 0 \\ 1 & -1 & 2 \end{bmatrix}$ and the matrix $\boldsymbol{B}$ is such that $(\boldsymbol{AB})^{-1} = \begin{bmatrix} 8 & -17 & 9 \\ -5 & 10 & -6 \\ -3 & 5 & -4 \end{bmatrix}$

a) Show that $\boldsymbol{A}^{-1} = \boldsymbol{A}$

b) Find $\boldsymbol{B}^{-1}$