Seminar 12: Inverse matrix

Problem 1: EMEA 596, ex. 1
Show that the inverse of $\mathbf{A} = \begin{pmatrix} 3 & 0 \\ 2 & -1 \end{pmatrix}$ is $\mathbf{B} = \begin{pmatrix} 1/3 & 0 \\ 2/3 & -1 \end{pmatrix}$.

Problem 2: EMEA 596, ex. 3
Find the numbers a and b such that matrix $\mathbf{A}$ is inverse to $\mathbf{B}$, where

$$\mathbf{A} = \begin{pmatrix} 2 & -1 & -1 \\ a & 1/4 & b \\ 1/8 & 1/8 & -1/8 \end{pmatrix} \quad \text{and} \quad \mathbf{B} = \begin{pmatrix} 1 & 2 & 4 \\ 0 & 1 & 6 \\ 1 & 3 & 2 \end{pmatrix}.$$

Problem 3: EMEA 599, ex. 1, 5 c
Find the inverse to the matrix

$$(a)\ \begin{pmatrix} 2 & 3 \\ 4 & 5 \end{pmatrix} \qquad (b)\ \begin{pmatrix} 1 & 0 & 2 \\ 2 & -1 & 0 \\ 0 & 2 & -1 \end{pmatrix} \qquad (c)\ \begin{pmatrix} 1 & 0 & 0 \\ -3 & -2 & 1 \\ 4 & -16 & 8 \end{pmatrix}.$$

Problem 4: EMEA 599, ex. 5 c
Use Jordan's elimination method to compute the inverse to $\mathbf{A}$ where $\mathbf{A} = \begin{pmatrix} 3 & 2 & -1 \\ -1 & 5 & 8 \\ -9 & -6 & 3 \end{pmatrix}$. Check the results using the formula $\mathbf{A}\mathbf{A}^{-1} = \mathbf{I}$.

Problem 5: EMEA 596, ex. 4
Solve following linear systems using inverse matrix:

$$(a)\ \begin{array}{rcrcl} 2x & - & 3y & = & 3 \\ 3x & - & 4y & = & 5 \end{array} \qquad (b)\ \begin{array}{rcrcl} 2x & - & 3y & = & 8 \\ 3x & - & 4y & = & 11 \end{array} \qquad (c)\ \begin{array}{rcrcl} 2x & - & 3y & = & 0 \\ 3x & - & 4y & = & 0 \end{array}.$$