Matrix Theory and Differential Equations
Quiz 3, 10/13/6

Question 1

Find the inverse of the matrix \( A \) and use it to solve the equations \( AX = B \) and \( YA = B \), where \( A \) and \( B \) are the following matrices:

\[
A = \begin{pmatrix} -3 & 2 \\ -7 & 5 \end{pmatrix}, \quad B = \begin{pmatrix} 5 & 1 \\ -4 & -3 \end{pmatrix}
\]

Question 2

By row reduction of a suitable augmented matrix, find the inverse of the following matrix \( C \):

\[
C = \begin{pmatrix} 1 & 3 & -1 \\ 2 & 5 & -2 \\ -3 & -4 & 5 \end{pmatrix}.
\]

Also find \( \det(C) \), \( \det(C^2) \) and \( \det(C^{-1}) \).

Question 3

Using suitable row operations to simplify your calculations, find the determinant of the following matrix \( D \), listing the operations as you go:

\[
D = \begin{pmatrix} 1 & 2 & 0 & -2 \\ 3 & 7 & 2 & 1 \\ 2 & 6 & 4 & -2 \\ 0 & 3 & 6 & -2 \end{pmatrix}.
\]

Is \( D \) invertible? Explain your answer.