MATH 1210   Tutorial # 11

Nov. 24 - 30, 2011

1. Find all values of c , if any, for which the matrix

$$A = \begin{pmatrix} c & 1 & 0 \\ 1 & c & 1 \\ 0 & 1 & c \end{pmatrix}$$

is invertible. Find A^{-1} for those values of c .

2. Find $\det(\mathrm{adj}(A))$ if A is a 7×7 matrix such that $\det(A) = 3$. Does the answer depend on the choice of A ? Why or why not?"
Hint: use $A^{-1} = [1/\det(A)]\mathrm{adj}(A)$.

3. Given the matrix

$$A = \begin{pmatrix} \cos\theta & \sin\theta & 0 \\ -\sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{pmatrix}.$$

(a) Find adj (A) .
(b) Find det (A) and determine for which values of θ the matrix A is invertible.
(c) Find A^{-1} by using
    (i) the adjoint matrix method for inversion of a matrix;
    (ii) the direct method.

4. Determine whether or not the system of linear equations

$$
\begin{array}{rcrcrcrcl}
x_1 & + & 3x_2 & + & x_3 & + & x_4 & = & 1 \\
2x_1 & + & 5x_2 & + & 2x_3 & + & 2x_4 & = & 1 \\
x_1 & + & 3x_2 & + & 8x_3 & + & 9x_4 & = & 1 \\
x_1 & + & 3x_2 & + & 2x_3 & + & x_4 & = & 1
\end{array}
$$

has a unique solution. If "yes", find the solution by the inverse matrix method.