

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 $\det(\text{adj}(A))$ 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 $A^{-1} = [1/\det(A)]\text{adj}(A)$.

3. Given the matrix

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

- (a) Find $\text{adj}(A)$.
(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

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

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