Exam 3

Linear Algebra, Dave Bayer, March 8, 2014

[1] Find the determinant of the matrix

$$\begin{bmatrix} 2 & 2 & 3 & 3 \\ 1 & 1 & 1 & 1 \\ 3 & 4 & 5 & 6 \\ 3 & 3 & 4 & 9 \end{bmatrix}$$

[2] Find the inverse of the matrix

$$\begin{bmatrix} 0 & 2 & 1 \\ 3 & 0 & 2 \\ 1 & 1 & 0 \end{bmatrix}$$

[3] Find w/y where

$$\begin{bmatrix} 0 & 1 & 1 & 0 \\ 1 & 0 & 1 & 1 \\ 1 & 1 & 0 & 1 \\ 2 & 1 & 1 & 0 \end{bmatrix} \begin{bmatrix} w \\ x \\ y \\ z \end{bmatrix} = \begin{bmatrix} a \\ b \\ c \\ d \end{bmatrix}$$

[4] Find A^n where A is the matrix

$$\begin{bmatrix} 2 & 6 \\ 2 & 3 \end{bmatrix}$$

Your final answer should be in the form

$$A^n = r^n B + s^n C$$

[5] Find $f(n)$, where $f(n)$ is the determinant of the $n \times n$ matrix in the sequence

$$\begin{bmatrix} 5 \end{bmatrix} \qquad \begin{bmatrix} 5 & 2 \\ 3 & 5 \end{bmatrix} \qquad \begin{bmatrix} 5 & 2 & 0 \\ 3 & 5 & 2 \\ 0 & 3 & 5 \end{bmatrix} \qquad \begin{bmatrix} 5 & 2 & 0 & 0 \\ 3 & 5 & 2 & 0 \\ 0 & 3 & 5 & 2 \\ 0 & 0 & 3 & 5 \end{bmatrix} \qquad \begin{bmatrix} 5 & 2 & 0 & 0 & 0 \\ 3 & 5 & 2 & 0 & 0 \\ 0 & 3 & 5 & 2 & 0 \\ 0 & 0 & 3 & 5 & 2 \\ 0 & 0 & 0 & 3 & 5 \end{bmatrix}$$

Your final answer should be in the form $f(n) = a\, r^n + b\, s^n$