

**Math 429 Fall 2005**  
**Assignment 7: Due by Oct 31**

1. Find the determinant of the following matrices.

(1)

$$\begin{pmatrix} 2 & 1 & 1 & 1 \\ 1 & 3 & 1 & 1 \\ 1 & 1 & 4 & 1 \\ 1 & 1 & 1 & 5 \end{pmatrix}$$

(2)

$$\begin{pmatrix} a & b & b \\ b & a & b \\ b & b & a \end{pmatrix}$$

2. (1) Find the determinant of the matrix

$$\begin{pmatrix} 1 & 1 & 1 & 1 \\ a & b & c & d \\ a^2 & b^2 & c^2 & d^2 \\ a^3 & b^3 & c^3 & d^3 \end{pmatrix}$$

where  $a$ ,  $b$ ,  $c$  and  $d$  are complex numbers.

- (2) Find all solutions of the system

$$\begin{aligned} a + b + c + d &= 0 \\ a^2 + b^2 + c^2 + d^2 &= 0 \\ a^3 + b^3 + c^3 + d^3 &= 0 \\ a^4 + b^4 + c^4 + d^4 &= 0 \end{aligned}$$

where  $a$ ,  $b$ ,  $c$  and  $d$  are complex numbers.

3. Prove that inverse matrix of an invertible upper triangular matrix is upper triangular matrix, too.