淡江大學99學年度碩士班招生考試試題

系別：資訊工程學系
資訊工程學系資訊網路與通訊碩士班

科目：數　學(含離散數學、線性代數)

准帶項目請打「V」	
	計 算 機

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1. Determine the coefficient of x^{28} in $f(x) = (x^3 + x^4 + x^5 + \ldots)^5$. (15pts)

2. Prove that for all $n \in Z^+$, $\binom{2n}{n} = \sum_{k=0}^{n} \binom{n}{k}^2$ (15pts)

3. Find the area of the triangle having vertices P(1, –2, 3), Q(3, 7, 6) and R(6, –7, –3). (14 pts)

4. Find the volume of the parallelepiped whose incident sides extend from the first point to each of the other three. P_1(–1, 2, 3), P_2(2, 5, 4), P_3(1, 6, –3), and P_4(6, –4, 7). (14 pts)

5. Find the inverse of the following matrix. (14 pts)

$$\begin{bmatrix} 6 & 4 & -6 & -2 \\ 7 & 0 & 0 & 4 \\ 8 & -3 & 5 & -7 \\ 9 & 0 & 0 & 8 \end{bmatrix}$$

6. Find all eigenvalues and corresponding eigenvectors of the following matrix. (14 pts)

$$\begin{bmatrix} 5 & 8 & 16 \\ 4 & 1 & 8 \\ -4 & -4 & -11 \end{bmatrix}$$

7. Find an LU- decomposition of $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & -6 & -6 \\ -7 & -7 & 9 \end{bmatrix}$ (14 pts)