

銘傳大學九十學年度轉學生招生考試

七月二十九日 第五節

資管 轉三

管理數學 試題

請按照題號依序橫式作答，並請將答案標示清楚。

- 一、Find the values of a such that following linear system (1) exactly one solution, (2) infinitely many solution, and (3) no solution. 15%

$$x + y - z = 2$$

$$x + 2y + z = 3$$

$$x + y + (a^2 - 5)z = a$$

- 二、Let $A = \begin{bmatrix} a & b & c \\ p & q & r \\ x & y & z \end{bmatrix}$ and $|A|=5$, compute (1) $|2A|$ (2) $|2A^{-1}|$ (3) $|(2A)^{-1}|$

(4) $|adjA|$ (5) $\begin{bmatrix} a+2p & b+2q & c+2r \\ -x & -y & -z \\ 3p-5x & 3q-5y & 3r-5z \end{bmatrix}$ 15%

- 三、Let A be 7×4 matrix whose rank is 4. (Justify your answer)

(1) Are the rows of A linearly dependent or linearly independent? 5%

(2) Are the columns of A linearly dependent or linearly independent? 5%

- 四、(1) Use the Gram-Schmidt process to transform the basis $\{(1,1,1), (0,1,1), (1,2,3)\}$ for \mathbb{R}^3 into an orthonormal basis for \mathbb{R}^3 . 10%

(2) Write $(2,3,1)$ as a linear combination of the basis obtained in part(1). 5%

- 五、Let $L: \mathbb{R}^n \rightarrow \mathbb{R}^m$ be a linear transformation defined by $L(x) = Ax, x \in \mathbb{R}^n$ where A is an $m \times n$ matrix

(1) Show that L is one-to-one if and only if $\text{rank}A = n$. 10%

(2) Show that L is onto if and only if $\text{rank}A=m$. 10%

六、(1) Orthogonally diagonalize the following symmetric matrix

$$A = \begin{bmatrix} 5 & 4 & 2 \\ 4 & 5 & 2 \\ 2 & 2 & 2 \end{bmatrix} \quad 15\%$$

(2) Compute A^5

試題完