

中國文化大學 九十三 學年度 第二學期 期中 考試試卷					
考試科目	任課老師	系級	考試日期	份數	備註
工程數學	陳為仁	機二 A	94/04/20	80	Close books

- Given three points $A = (6, 1, 1)$, $B = (7, -2, 4)$ and $C = (8, -4, 3)$.
 - Determine whether the three points are collinear.
 - Verify if \overline{AB} and \overline{BC} are orthogonal.
 - Find the area of the parallelogram having incident sides extending from the first point to each of the other two.
- Find the parametric equation of the straight line containing the given two points $(0, 1, 3)$ and $(0, 0, 1)$.
 - Find the equation of plane containing the given three points $(1, 2, 1)$, $(-1, 1, 3)$ and $(-2, -2, -2)$.
- Given a set S consisting of all vectors in the plane $2x-y+z=0$.
 - Prove that the set S is a subspace of \mathbb{R}^3 .
 - Determine a basis and the dimension for the subspace S .
- Given a matrix $A = \begin{bmatrix} -4 & 1 & 3 \\ 2 & 2 & 0 \end{bmatrix}$.
 - Find the reduced form A_R of matrix A .
 - Determine the rank of matrix A and state the reason.
 - Find a basis for the row space of matrix A and its dimension.
 - Find a basis for the column space of matrix A and its dimension.
- Given a linear system $\mathbf{AX} = \begin{bmatrix} -1 & 1 & 3 \\ 0 & 1 & 2 \end{bmatrix} \begin{Bmatrix} x_1 \\ x_2 \\ x_3 \end{Bmatrix} = \mathbf{B} = \begin{bmatrix} b_1 \\ b_2 \end{bmatrix}$.
 - Determine the dimension of the solution space of the homogeneous system $\mathbf{AX}=\mathbf{O}$ if matrix $\mathbf{B}=\mathbf{O}$.
 - Show that the nonhomogeneous system $\mathbf{AX}=\mathbf{B}$ has a solution if $\mathbf{B} = \begin{bmatrix} 4 \\ -2 \end{bmatrix}$.
 - Find the general solution of nonhomogeneous system in (2).
- Given two square matrices $A = \begin{bmatrix} 4 & -2 \\ -2 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -1 \\ 0 & 1 \end{bmatrix}$.
 - Determine whether the matrix is singular or nonsingular. Why?
 - Find the inverse of the matrix if it is nonsingular.
 - Determine whether the matrix AB has an inverse or not.