

Team Quiz #07 (19/12/2013)
(1 Hr.)

Group : _____

Section : _____

Please answer the following questions:

1. Show whether $S = \left\{ \begin{bmatrix} 8 & -2 \\ 10 & 0 \end{bmatrix}, \begin{bmatrix} -12 & 3 \\ -15 & 0 \end{bmatrix} \right\}$, a subset of $M_{2 \times 2}$, is linearly dependent or linearly independent.
2. Show that if the set $\{\vec{a}, \vec{b}, \vec{c}\}$ is linearly independent, then so is the set $\{\vec{a}, \vec{a} + \vec{b}, \vec{a} + \vec{b} + \vec{c}\}$.
3. Show that whether $B = \langle 1, 1 + x, 1 + x^2 \rangle$ is a basis for P_2 .
4. A **symmetric matrix** is a square matrix that is equal to its transpose that is entry i, j equals entry j, i . Find a basis for the space of symmetric 3×3 matrices.
5. Find a basis for, and the dimension of, the solution set of this system.
$$\begin{aligned} x_1 - 4x_2 + 3x_3 - x_4 &= 0 \\ 2x_1 - 8x_2 + 6x_3 - 2x_4 &= 0 \end{aligned}$$
6. What is the relationship between
 - a) $\text{rank}(A)$ and $\text{rank}(-A)$
 - b) $\text{rank}(A)$ and $\text{rank}(kA)$
 - c) $\text{rank}(A), \text{rank}(B)$ and $\text{rank}(A + B)$