Assignment No 2 (BCS-A,B,C)

Deadline Thursday 18-04-23

Q1: Using properties of determinant, show that

$$\begin{vmatrix} 3x + 2y & 2y & 2z \\ 4x + 3y & 3y & 3z \\ 5x + 5y & 4y & 5z \end{vmatrix} = xyz$$

Q2: Let W be the set of all vectors of the form $\begin{bmatrix} 2x + 3y \\ -x \\ y \end{bmatrix}$, where

$x, y \in R$. Is W a subspace of vector space R^3? If yes then find basis of subspace W.

Q3: Determine whether the set $S = \left\{ \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}, \begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix}, \begin{bmatrix} 2 & 1 \\ 3 & 2 \end{bmatrix}, \begin{bmatrix} 1 & 1 \\ 2 & 2 \end{bmatrix} \right\}$

forms a basis for M_{22}. If yes then express the vector $A = \begin{bmatrix} 1 & 0 \\ 2 & 0 \end{bmatrix}$ as a linear combination of the vectors in S.

Q4: For which real values of a do the polynomials

$$p_1(t) = at^2 - \frac{1}{2}t - \frac{1}{2}; \ p_2(t) = -\frac{1}{2}t^2 + at - \frac{1}{2}; \ p_3(t) = -\frac{1}{2}t^2 - \frac{1}{2}t + a$$

form basis for vector space $P_2(t)$?