To be presented in front of class by Roll no. 32,33 after lecture (if any)

Due date: 24-01-2022

Roll no: 32

- Express the following matrix as the product of elementary matrices.

$$\begin{pmatrix} 1 & 0 & 0 \\ -1 & 2 & 0 \\ 4 & -8 & 6 \end{pmatrix}$$

- Use the elementary row operations to find the row reduced echelon form and then evaluate rank, and nullity of the following matrix.

$$\begin{pmatrix} 0 & 1 & 2 & 0 & 2 \\ 1 & 3 & 1 & 0 & 1 \\ 3 & 4 & -2 & 1 & 0 \end{pmatrix}$$

- Which of the following set/sets is/are a subspace of $\mathbb{R}^3$ over $\mathbb{R}$? (Justify the argument either using subspace test or by counterexamples)

- $W_1 = \{(x, y, z) \in \mathbb{R}^3 | \ \sin(x) + \sin(y) + \sin(z) = 0\}$
- $W_2 = \{(x, y, z) \in \mathbb{R}^3 | \ e^z = 1 + x + y\}$

- Find out which of the following vectors are linearly independent or dependent.

1. $u = (1,2,3), v = (2,5,7), w = (1,3,5)$
2. $v_1 = (1,1,1,1), v_2 = (0,1,1,1), v_3 = (0,0,1,1), v_4 = (1,2,3,4)$

Roll no: 33

- Express the following matrix as the product of elementary matrices.

$$\begin{pmatrix} 1 & 0 & 1 \\ 4 & -2 & 0 \\ 0 & 3 & 1 \end{pmatrix}$$

- Use the elementary row operations to find the row reduced echelon form and then evaluate rank, and nullity of the following matrix.

$$\begin{pmatrix} -1 & 1 & 0 & 2 \\ 1 & 2 & 2 & 3 \\ 1 & 3 & 0 & 1 \\ 3 & 4 & 1 & 0 \end{pmatrix}$$

- Which of the following set/sets is/are a subspace of $\mathbb{R}^3$ over $\mathbb{R}$? (Justify the argument either using subspace test or by counterexamples.)

  a. $W_1 = \{(x, y, z) \in \mathbb{R}^3 \mid 2x - 3y + z = 0\}$

  b. $W_2 = \{(x, y, z) \in \mathbb{R}^3 \mid z = xy\}$

- Find out which of the following vectors are linearly independent or dependent.

  1. $u = (1,0,1), v = (1,-1,0), w = (0,1,1)$
  2. $v_1 = (-7,1,3), v_2 = (0,1,3), v_3 = (-2,2,1), v_4 = (-1,3,4)$
