

1. Solve the following system and express general solutions.

$$x_1 - x_2 + x_3 + 2x_4 = 0$$

$$x_1 - 3x_3 + 2x_4 = 0$$

$$2x_1 - x_2 - 2x_3 + 4x_4 = 0$$

2. Explain terminologies

- A. Standard basis
- B. Span
- C. Linear independence
- D. Basis
- E. Dimension

3. Determine whether the following sets of vectors are linear dependent or independent in  $\mathbf{R}^3$ . (a)  $\{(1, 2, 0), (0, 1, -3), (1, 1, 2)\}$ . (b)  $\{(1, 2, 3), (-2, 0, 1), (4, -4, -9)\}$ .

4. Define dot product and show the commutative property