Submission 3 (February 15th)

The respondent's email (**deepanshu21249@iiitd.ac.in**) was recorded on submission of this form.

*

The set of all rational numbers is called $\mathbb{Q}$.

The set of all n-tuples of rational numbers is called $\mathbb{Q}^n$.

We say $v_1, \ldots, v_n \in \mathbb{R}$ are <u>linearly independent over $\mathbb{Q}$</u> if the equation

$$x_1v_1 + x_2v_2 + \cdots + x_nv_n = 0$$

has <u>no rational solution</u>, in other words if there is no $(x_1, x_2, \ldots, x_n) \in \mathbb{Q}^n$ for which $x_1v_1 + \cdots + x_nv_n = 0$ holds true.

Which of the following sets are linearly independent over $\mathbb{Q}$?

- ○ {e, pi, 1, i}
- ○ {e, pi, pi-e, e*pi}
- ○ {1, e, e/2}
- ◉ {e^(i*pi), pi, 1}

Choose from the below, which is a subspace of the vector space of all polynomials of degree less then or equal to 3 ? *

- ◉ All of the above
- ○ All linear polynomials
- ○ All constant polynomials
- ○ All quadratic polynomials

*

Assume a, b, c are linearly independent vectors in $\mathbb{R}^n$. Choose the set that is NOT linearly independent from the following :

- ○ {a+b, b+c, c+a}
- ○ {2a-b, 2b-c, 2c-a}
- ◉ {a-b, b-c, c-a}
- ○ {2a, 3b, 5c}

*

Consider $S_1 = \left\{ \begin{bmatrix} x \\ y \\ z \end{bmatrix} \in \mathbb{R}^3 \;\middle|\; xy + z = 0 \right\}$

$S_2 = \left\{ \begin{bmatrix} x \\ y \\ z \end{bmatrix} \in \mathbb{R}^3 \;\middle|\; 2x = y - z \right\}$

$S_3 = \left\{ \begin{bmatrix} x \\ y \\ z \end{bmatrix} \in \mathbb{R}^3 \;\middle|\; x = 6t,\ y = 4t,\ t \in \mathbb{R} \right\}$

Which of the above are subspaces of $\mathbb{R}^3$?

- ○ S1 and S2
- ○ None of the above
- ◉ S2 and S3
- ○ S1, S2 and S3
- ○ S3 and S1