

1.(1 pt) Determine whether the given set S is a subspace of the vector space V .

- A. $V = M_n(\mathbb{R})$, and S is the subset of all symmetric matrices
- B. $V = C^5(I)$, and S is the subset of V consisting of those functions satisfying the differential equation $y^{(5)} = 0$.
- C. V is the vector space of all real-valued functions defined on the interval $[a, b]$, and S is the subset of V consisting of those functions satisfying $f(a) = f(b)$.
- D. V is the vector space of all real-valued functions defined on the interval $[a, b]$, and S is the subset of V consisting of those functions satisfying $f(a) = 4$.
- E. $V = \mathbb{R}^2$, and S consists of all vectors (x_1, x_2) satisfying $x_1^2 - x_2^2 = 0$.
- F. $V = M_n(\mathbb{R})$, and S is the subset of all $n \times n$ matrices with $\det(A) = 0$.
- G. $V = \mathbb{R}^2$, and S is the set of all vectors (x_1, x_2) in V satisfying $4x_1 + 5x_2 = 0$.

2.(1 pt) The vectors

$$v_1 = \begin{bmatrix} 5 \\ -2 \\ 0 \end{bmatrix}, \quad v_2 = \begin{bmatrix} -4 \\ 2 \\ 3 \end{bmatrix}, \quad \text{and} \quad v_3 = \begin{bmatrix} 1 \\ 0 \\ k \end{bmatrix}$$

form a basis for \mathbb{R}^3 if and only if $k \neq$ _____ .

3.(1 pt) (a) If S is the subspace of $M_5(\mathbb{R})$ consisting of all symmetric matrices, then $\dim S =$ _____ .

(b) If S is the subspace of $M_3(\mathbb{R})$ consisting of all skew-symmetric matrices, then $\dim S =$ _____ .

4.(1 pt) You'll need to use formatted text mode in order to do this problem: click the "formatted text" button at the bottom of the page and then click "submit answer".

The set

$$B = \left\{ \begin{bmatrix} 1 \\ -10 \end{bmatrix}, \begin{bmatrix} 2 \\ -13 \end{bmatrix} \right\}$$

is a basis for \mathbb{R}^2 . Find the coordinates of the vector

$$x = \begin{bmatrix} 7 \\ -56 \end{bmatrix}$$

relative to the basis B :

$$[x]_B = \begin{bmatrix} \text{---} \\ \text{---} \end{bmatrix}$$

5.(1 pt) You'll need to use formatted text mode in order to do this problem: click the "formatted text" button at the bottom of the page and then click "submit answer".

The set $B = \{-4 - 4x^2, -8 - 4x - 8x^2, 21 + 8x + 20x^2\}$ is a basis for P_2 . Find the coordinates of $p(x) = 51 + 16x + 48x^2$ relative to this basis:

$$[p(x)]_B = \begin{bmatrix} \text{---} \\ \text{---} \\ \text{---} \end{bmatrix}$$

6.(1 pt) Let

$$v_1 = \begin{bmatrix} -4 \\ 4 \\ 3 \end{bmatrix}, \quad v_2 = \begin{bmatrix} -4 \\ 1 \\ -1 \end{bmatrix}, \quad y = \begin{bmatrix} -24 \\ 15 \\ h \end{bmatrix}$$

For what value of h is y in the plane spanned by v_1 and v_2 ?
 $h =$ _____