1. –/2 points — My Notes — Ask Your Teacher

Consider the vector space with basis $B = \{\mathbf{w}_1, \mathbf{w}_2\}$ where $\mathbf{w}_1 = (-2,2)$ and $\mathbf{w}_2 = (-2, -2)$. Determine if the vector $\mathbf{v} = (2, -10)$ lies in the span of B and, if so, determine the values of c_1 and c_2 such that $c_1\mathbf{w}_1 + c_2\mathbf{w}_2 = \mathbf{v}$. If $\mathbf{v}$ is not in the span of B, enter DNE in all entries.

$c_1 =$

$c_2 =$

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2. –/2 points — My Notes — Ask Your Teacher

Consider the vector space with basis $B = \{\mathbf{w}_1, \mathbf{w}_2\}$ where $\mathbf{w}_1 = (-3,-1,-1)$ and $\mathbf{w}_2 = (-1, -2, -1)$. Determine if the vector $\mathbf{v} = (4, 3, 2)$ lies in the span of B and, if so, determine the values of c_1 and c_2 such that $c_1\mathbf{w}_1 + c_2\mathbf{w}_2 = \mathbf{v}$. If $\mathbf{v}$ is not in the span of B, enter DNE in all entries.

$c_1 =$

$c_2 =$

3. –/2 points — My Notes — Ask Your Teacher

Consider the vector space with basis $B = \{\mathbf{w}_1, \mathbf{w}_2\}$ where $\mathbf{w}_1 = (3,-2,-1)$ and $\mathbf{w}_2 = (1, 0, 0)$. Determine if the vector $\mathbf{v} = (8, -6, -3)$ lies in the span of B and, if so, determine the values of c_1 and c_2 such that $c_1\mathbf{w}_1 + c_2\mathbf{w}_2 = \mathbf{v}$. If $\mathbf{v}$ is not in the span of B, enter DNE in all entries.

$c_1 =$

$c_2 =$

4. –/3 points   My Notes   Ask Your Teacher

Consider the vector space with basis $B = \{\mathbf{w}_1, \mathbf{w}_2, \mathbf{w}_3\}$ where $\mathbf{w}_1 = (-1,2,0)$, $\mathbf{w}_2 = (-1, -2, 1)$, and $\mathbf{w}_3 = (-1, -2, -1)$. Determine if the vector $\mathbf{v} = (-3, 2, -3)$ lies in the span of B and, if so, determine the values of c_1, c_2 and c_3 such that $c_1\mathbf{w}_1+c_2\mathbf{w}_2+c_3\mathbf{w}_3 = \mathbf{v}$. If $\mathbf{v}$ is not in the span of B, enter DNE in all entries.

$c_1 =$

$c_2 =$

$c_3 =$

5. –/3 points   My Notes   Ask Your Teacher

Consider the vector space with basis $B = \{\mathbf{w}_1, \mathbf{w}_2, \mathbf{w}_3\}$ where $\mathbf{w}_1 = (-1,-2,2,0)$, $\mathbf{w}_2 = (2, 2, -1,0)$, and $\mathbf{w}_3 = (2, -3, -1,1)$. Determine if the vector $\mathbf{v} = (1, -6, -5,2)$ lies in the span of B and, if so, determine the values of c_1, c_2 and c_3 such that $c_1\mathbf{w}_1+c_2\mathbf{w}_2+c_3\mathbf{w}_3 = \mathbf{v}$. If $\mathbf{v}$ is not in the span of B, enter DNE in all entries.

$c_1 =$

$c_2 =$

$c_3 =$

6. –/3 points   My Notes   Ask Your Teacher

Consider the vector space with basis $B = \{\mathbf{w}_1, \mathbf{w}_2, \mathbf{w}_3\}$ where $\mathbf{w}_1 = (-1,0,1,-2)$, $\mathbf{w}_2 = (0, 2, 1,0)$, and $\mathbf{w}_3 = (1, -2, 1,1)$. Determine if the vector $\mathbf{v} = (-2, 8, 1,-3)$ lies in the span of B and, if so, determine the values of c_1, c_2 and c_3 such that $c_1\mathbf{w}_1+c_2\mathbf{w}_2+c_3\mathbf{w}_3 = \mathbf{v}$. If $\mathbf{v}$ is not in the span of B, enter DNE in all entries.

$c_1 =$

$c_2 =$

$c_3 =$

7. –/3 points My Notes Ask Your Teacher

Consider the following 3×5 matrix A and its row-reduced echelon form on the right:

$$A = \begin{bmatrix} -2 & 4 & -3 & 2 & 1 \\ 2 & -4 & 0 & -2 & 2 \\ 0 & 0 & -2 & 0 & 2 \end{bmatrix} \Rightarrow \begin{bmatrix} 1 & -2 & 0 & -1 & 1 \\ 0 & 0 & 1 & 0 & -1 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

(a) Which of the following is a basis of the row space of A?

- {(1,-2,0,-1,1),(0,0,1,0,-1)}
- {(-2,4,-3,2,1)}
- {(-2,4,-3,2,1),(2,-4,0,-2,2),(0,0,-2,0,2)}
- {(1,-2,0,-1,1),(0,0,0,0,0)}

(b) Which of the following is a basis of the column space of A?

- {(-2,2,0),(-3,0,-2)}
- {(1,0,0),(0,1,0)}
- {(4,-4,0),(2,-2,0),(1,2,2)}
- {(1,-2,0,-1,1),(0,0,1,0,-1)}

(c) Which of the following is a basis of the nullspace of A?

- {(1,2,0,1,-1),(0,0,1,0,1)}
- {(1,-2,0,-1,1),(0,0,1,0,-1)}
- {(-2,1,0,0,0),(-1,0,0,1,0),(1,0,-1,0,1)}
- {(2,1,0,0,0),(1,0,0,1,0),(-1,0,1,0,1)}

–/3 points My Notes Ask Your Teacher

Determine if the vector $\mathbf{v}$ = (0, 4, -3,-3) lies in the span of $S = \{\mathbf{w}_1, \mathbf{w}_2, \mathbf{w}_3\}$ where $\mathbf{w}_1$ =(-2,-2,1,1) , $\mathbf{w}_2$ = (-2, 1, 1,-1) , and $\mathbf{w}_3$ = (0, -1, 1,1) . If so, determine the values of c_1 , c_2 and c_3 such that $c_1\mathbf{w}_1+c_2\mathbf{w}_2+c_3\mathbf{w}_3 = \mathbf{v}$. If $\mathbf{v}$ is not in the span of S , enter DNE in all entries.

$c_1 =$

$c_2 =$

$c_3 =$

–/2 points My Notes Ask Your Teacher

Determine if the vector $\mathbf{v}$ = (-3, -6, 6) lies in the span of $S = \{\mathbf{w}_1, \mathbf{w}_2\}$ where $\mathbf{w}_1$ =(-3,-2,2) and $\mathbf{w}_2$ = (2, 0, 0) . If so, determine the values of c_1 and c_2 such that $c_1\mathbf{w}_1+c_2\mathbf{w}_2 = \mathbf{v}$. If $\mathbf{v}$ is not in the span of S , enter DNE in all entries.

$c_1 =$

$c_2 =$

–/3 points My Notes Ask Your Teacher

Determine if the vector $\mathbf{v}$ = (3, -1, 7) lies in the span of $S = \{\mathbf{w}_1, \mathbf{w}_2, \mathbf{w}_3\}$ where $\mathbf{w}_1$ =(1,0,3) , $\mathbf{w}_2$ = (-1, 1, -2) , and $\mathbf{w}_3$ = (1, -2, 2) . If so, determine the values of c_1 , c_2 and c_3 such that $c_1\mathbf{w}_1+c_2\mathbf{w}_2+c_3\mathbf{w}_3 = \mathbf{v}$. If $\mathbf{v}$ is not in the span of S , enter DNE in all entries.

$c_1 =$

$c_2 =$

$c_3 =$

11. –/4 points My Notes Ask Your Teacher

Compute the following determinants, and use them to determine if the following vectors are linearly independent or linearly dependent: $\mathbf{v}_1$ =(-1,-3,2) and $\mathbf{v}_2$ = (1, -1, -2) .

$$det\begin{bmatrix} -1 & 1 \\ -3 & -1 \end{bmatrix} = \underline{\qquad}$$

$$det\begin{bmatrix} -1 & 1 \\ 2 & -2 \end{bmatrix} = \underline{\qquad}$$

$$det\begin{bmatrix} -3 & -1 \\ 2 & -2 \end{bmatrix} = \underline{\qquad}$$

The vectors $\mathbf{v}_1$ and $\mathbf{v}_2$ are [Select] .

12. –/4 points My Notes Ask Your Teacher

Compute the following determinants, and use them to determine if the following vectors are linearly independent or linearly dependent: $\mathbf{v}_1$ =(2,-2,-1) and $\mathbf{v}_2$ = (-2, 2, 1) .

$$det\begin{bmatrix} 2 & -2 \\ -2 & 2 \end{bmatrix} = \underline{\qquad}$$

$$det\begin{bmatrix} 2 & -2 \\ -1 & 1 \end{bmatrix} = \underline{\qquad}$$

$$det\begin{bmatrix} -2 & 2 \\ -1 & 1 \end{bmatrix} = \underline{\qquad}$$

The vectors $\mathbf{v}_1$ and $\mathbf{v}_2$ are [Select] .

13. –/5 points My Notes Ask Your Teacher

Compute the following determinants, and use them to determine if the following vectors are linearly independent or linearly dependent: $\mathbf{v}_1$ =(-1,1,0,0) , $\mathbf{v}_2$ = (0, 1, -1,1) , and $\mathbf{v}_3$ = (1, 1, -1,-1) .

$$det\begin{bmatrix} -1 & 0 & 1 \\ 1 & 1 & 1 \\ 0 & -1 & -1 \end{bmatrix} = \square$$

$$det\begin{bmatrix} -1 & 0 & 1 \\ 1 & 1 & 1 \\ 0 & 1 & -1 \end{bmatrix} = \square$$

$$det\begin{bmatrix} -1 & 0 & 1 \\ 0 & -1 & -1 \\ 0 & 1 & -1 \end{bmatrix} = \square$$

$$det\begin{bmatrix} 1 & 1 & 1 \\ 0 & -1 & -1 \\ 0 & 1 & -1 \end{bmatrix} = \square$$

The vectors $\mathbf{v}_1$, $\mathbf{v}_2$, and $\mathbf{v}_3$ are [Select] .

14. –/5 points | My Notes | Ask Your Teacher

Compute the following determinants, and use them to determine if the following vectors are linearly independent or linearly dependent: $\mathbf{v}_1$ =(1,0,1,-1) , $\mathbf{v}_2$ = (0, 2, 0,-2) , and $\mathbf{v}_3$ = (-1, -2, -1,3) .

$$det\begin{bmatrix} 1 & 0 & -1 \\ 0 & 2 & -2 \\ 1 & 0 & -1 \end{bmatrix} = \_\_\_\_$$

$$det\begin{bmatrix} 1 & 0 & -1 \\ 0 & 2 & -2 \\ -1 & -2 & 3 \end{bmatrix} = \_\_\_\_$$

$$det\begin{bmatrix} 1 & 0 & -1 \\ 1 & 0 & -1 \\ -1 & -2 & 3 \end{bmatrix} = \_\_\_\_$$

$$det\begin{bmatrix} 0 & 2 & -2 \\ 1 & 0 & -1 \\ -1 & -2 & 3 \end{bmatrix} = \_\_\_\_$$

The vectors $\mathbf{v}_1$, $\mathbf{v}_2$, and $\mathbf{v}_3$ are [Select] .

15. –/1 points | My Notes | Ask Your Teacher

Which of the following subsets W are subspaces of the given vector space V ?

- ☐ $V = \mathbb{R}^3,\ W = \{(x, y, 0) \in \mathbb{R}^3 \mid x, y \in \mathbb{R}\}$
- ☐ $V = \mathbb{R}^3,\quad W = \{(x, y, z) \in \mathbb{R}^3 \mid x^2 + y^2 + z^2 = 1\}$
- ☐ $V = \mathbb{R}^3,\ W = \{(s, 2t, -s) \in \mathbb{R}^3 \mid s, t \in \mathbb{R}\}$
- ☐ $V =$ the set of 2×2 matrices (with standard scalar multiplication and matrix addition operations), $W =$ matrices of form $\begin{bmatrix} a & -b \\ b & a \end{bmatrix}$
- ☐ $V = \mathbb{R}^2,\quad W = \{(t, t^2) \in \mathbb{R}^2 \mid t \in \mathbb{R}\}$
- ☐ $V = \mathbb{R}^3,\quad W = \{(x, y, z) \in \mathbb{R}^3 \mid x + y + 2z = 1\}$

16. –/3 points — My Notes — Ask Your Teacher

Consider the vector space with V consisting of all polynomials up to second order. Consider the set of "vectors" S = {$\mathbf{w}_1$, $\mathbf{w}_2$, $\mathbf{w}_3$} where $\mathrm{w}_1 = (-2)\,x^2 + (-1)\,x + (1)$, $\mathrm{w}_2 = (1)\,x^2 + (2)\,x + (-1)$, and $\mathrm{w}_3 = (-1)\,x^2 + (2)\,x + (-2)$. Determine if $\mathrm{v} = (-3)\,x^2 + (-7)\,x + (5)$ lies in the span of B and, if so, determine the values of c_1, c_2 and c_3 such that $c_1\mathrm{w}_1 + c_2\mathrm{w}_2 + c_3\mathrm{w}_3 = \mathrm{v}$. If **v** is not in the span of S, enter DNE in all entries.

$c_1 =$

$c_2 =$

$c_3 =$

17. –/2 points — My Notes — Ask Your Teacher

Determine if a general vector of the form **v** = (0,3,-2)· s + (-1,-5,4)· t lies in the span of S = {$\mathbf{w}_1$, $\mathbf{w}_2$} where $\mathbf{w}_1$ =(-1,1,0) and $\mathbf{w}_2$ = (-1, -2, 2) . If so, determine the values of c_1 and c_2 such that $c_1\mathbf{w}_1+c_2\mathbf{w}_2$ = **v** . If **v** is not in the span of S , enter DNE in all entries. (**Note:** The solution may depend upon s and t !)

$c_1 =$

$c_2 =$