

Question 9

Not yet answered

Marked out of 1.0

Flag question

Let $T : \mathbb{R}^2 \rightarrow \mathbb{R}^3$ linear transformation defined by $T\left(\begin{bmatrix} x_1 \\ x_2 \end{bmatrix}\right) = \begin{bmatrix} 2x_1 + 3x_2 \\ x_2 \\ 0 \end{bmatrix}$ then

Select one or more:

- ☐ T is one to one
- ☐ T is onto
- ☐ $\dim \text{Null} A = 1$.
- ☐ $Ax = b$ has at least one solution for every b in $\mathbb{R}^3$.
- ☐ $\text{Rank} A = 2$
- ☐ The columns of A are linearly independent

Question 10

Not yet answered

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Flag question

If we have 5×5 matrices with the following characteristic polynomials. Which of them can be diagonalizable

Select one:

- ☐ a. $t(t^2 - 4)(t^2 + 2)$
- ☐ b. $t(t^2 + 3)^2$
- ☐ c. $(t^2 - 9)(t^2 + 10)$
- ☐ d. Non of the mentioned
- ☒ e. $t(t^2 - 4)(t^2 - 1)$

Question 11

Not yet answered

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Suppose A is a 4×4 matrix so that

$$A \begin{bmatrix} 5 \\ 4 \\ 0 \\ 1 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 1 \\ 0 \end{bmatrix}, A \begin{bmatrix} 3 \\ 1 \\ 2 \\ 0 \end{bmatrix} = \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \end{bmatrix}, \text{ and } A \begin{bmatrix} 0 \\ 1 \\ -7 \\ 2 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 1 \end{bmatrix}$$

What is the second column of A^{-1} ?

Select one:

☐ a. $\begin{bmatrix} 0 \\ 1 \\ -7 \\ 2 \end{bmatrix}$

☐ b. $\begin{bmatrix} 3 \\ 1 \\ 2 \\ 0 \end{bmatrix}$

☐ c. $\begin{bmatrix} 2 \\ 0 \\ 1 \\ -2 \end{bmatrix}$

☐ d. $\begin{bmatrix} 5 \\ 4 \\ 0 \\ 1 \end{bmatrix}$

☐ e. Not enough information to tell

Question 4

Not yet
answered

Marked out of
1.0

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question

Let $S = \{1 + x, 1 + x + x^2, 1 + x + x^2 + x^3\}$

Which of the following vectors belong to Span S ?

Select one:

☒ a. $4 + 4x + 2x^2 + 3x^3$

☐ b. Non of the mentioned

☐ c. $x^2 + 5$

☐ d. $x^2 - 3x + 5$

Question 7

Not yet
answered

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1.0

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question

$$\text{Let } A = \begin{bmatrix} 0 & -2 \\ 1 & 0 \\ 0 & -1 \end{bmatrix}.$$

What is the eigenvalues of $A^T A$?

Select one:

- ☐ a. $\lambda = 3$ and $\lambda = 1$
- ☐ b. $\lambda = -1$, $\lambda = 2$ and $\lambda = 3$
- ☒ c. None of the mentioned
- ☐ d. $\lambda = 2$ and $\lambda = 1$
- ☐ e. $\lambda = -1$ and $\lambda = -5$

Question **33**

Not yet
answered

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1.0

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question

If a linear transformation is one-to-one, then it is invertible.

Select one:

☐ True

☐ False



Question **34**

Not yet
answered

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1.0

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question

There is a 5×5 matrix of rank 4 and determinant 1.

Select one:

☐ True

☐ False



Question 12

Not yet
answered

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1.0

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question

If A is 5×4 matrix, which of the following is possible

Select one or more:

☒ the linear transformation T_A is one to one

☐ the linear transformation T_A is onto

☐ Rows of A are linearly independent.

☐ $\dim \text{Row}(A) < \dim \text{Col}(A)$

☒ Row space of $A =$ Columns space of A^T

☒ Columns of A are linearly independent.

Question 5

Not yet
answered

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1.0

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question

Let $A = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 1 & 0 & 0 \end{bmatrix}$

Find all vectors $x \in \mathbb{R}^3$ that are both in $ColA$ and $NullA$?

Select one:

☒ a. Only the vector 0

☐ b. all multiples of $\begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$

☐ c. all solutions of $Ax = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$

☐ d. all multiples of $\begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$

☐ e. all solutions of $Ax = \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$

☐ f. there are no such vectors.

Question 9

Not yet answered

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If U and W are subspaces of a vector space V and $\dim U = \dim W$, then $U = W$.

Select one:

☐ True

☐ False



Question 10

Not yet answered

Marked out of 1.0

Flag question

If A is $n \times n$ matrix that satisfied $A^2 = A$, then $\det A = 0$

Select one:

☐ True

☐ False



Question 17

Not yet answered

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Flag question

For the square matrix A , if $A\mathbf{v} = \lambda\mathbf{v}$ for some vector $\mathbf{v}$, then λ is an eigenvalue of the matrix A .

Select one:

☐ True

☐ False



Question 18

Not yet answered

Marked out of 1.0

Flag question

If a subset of a vector space contains 0, then it is linearly dependent.

Select one:

☐ True

☐ False



Question 31

Not yet answered

Marked out of 1.0

Flag question

The span of any set of vectors is always a vector space.

Select one:

- ☒ True
- ☐ False

Question 32

Not yet answered

Marked out of 1.0

Flag question

If A is 3×3 matrix and $\det(A - \lambda I_3) = (1 - \lambda)^2(\lambda + 3)$, and the eigenspace of $\lambda = 1$ is $E = \text{span}\left\{\begin{bmatrix} 1 \\ 2 \\ 4 \end{bmatrix}\right\}$, then it is possible that A is diagonalizable.

Select one:

- ☐ True
- ☒ False

Question 6

Not yet
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question

Suppose A is a 3×3 matrix with columns $\mathbf{v}_1, \mathbf{v}_2$ and $\mathbf{v}_3$:

$$A = \begin{bmatrix} | & | & | \\ \mathbf{v}_1 & \mathbf{v}_2 & \mathbf{v}_3 \\ | & | & | \end{bmatrix}$$

and $\text{Nul}(A) = \text{Span} \left\{ \begin{bmatrix} 0 \\ -2 \\ 0 \end{bmatrix} \right\}$. Are the columns of A linearly dependent, and if so, what is a nontrivial dependence relation between them?

Select one:

☒ a. The columns of A are linearly dependent, but neither of the above options is a nontrivial dependence relation

☐ b. The columns of A are linearly dependent and $\mathbf{v}_1 - 2\mathbf{v}_2 + \mathbf{v}_3 = \mathbf{0}$

☐ c. The columns of A are linearly independent

☐ d. The columns of A are linearly dependent and a dependence relation is

$$0\mathbf{v}_1 + 0\mathbf{v}_2 + 0\mathbf{v}_3 = \mathbf{0}$$

☐ e. Not enough information to tell

Question 9

Not yet answered

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- ☐ $Ax = b$ has at least one solutions for every b in $\mathbb{R}^3$.

☒ $\text{Rank} A = 2$

☒ The columns of A are linearly independent

Question 10

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- ☐ b. $t(t^2 + 3)^2$
- ☐ c. $(t^2 - 9)(t^2 + 10)$
- ☐ d. Non of the mentioned
- ☐ e. $t(t^2 - 4)(t^2 - 1)$

Question 25

Not yet answered

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Let A and B be square matrices of the same size, then $A^2 - B^2 = (A + B)(A - B)$.

Select one:

☐ True

☐ False



Question 26

Not yet answered

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Flag question

In an n -dimensional vector space V , any set consisting of n linearly independent vectors is a spanning set for V .

Select one:

☐ True

☐ False



Question 19

Not yet answered

Marked out of 1.0

Flag question

For a any scalar and u and v any vector in a vector space V , $(au)v = a(uv)$

Select one:

☒ True

☐ False

Question 20

Not yet answered

Marked out of 1.0

Flag question

If A_θ is a rotation matrix, then $A_\theta^T = A_\theta^{-1}$

Select one:

☒ True

☐ False

Question 11

Not yet
answered

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1.0

Flag
question

Every system of linear equations has at least one solution.

Select one:

☐ True

☒ False



Question 12

Not yet
answered

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1.0

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question

In $\mathcal{P}$, the set $\{x, x^3, x^5, \dots\}$ is linearly dependent.

Select one:

☐ True

☒ False



Question 1

Not yet
answered

Marked out of
1.0

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question

If A is skew-symmetric matrix, then $\det A = 0$

Select one:

☐ True

☒ False



Question 2

Not yet
answered

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1.0

Flag
question

Any linearly independent set can be extended to a basis.

Select one:

☒ True



☐ False

Question 7

Not yet answered

Marked out of 1.0

Flag question

If 0 is an eigenvalue of $n \times n$ matrix A , then $Null(A) = \{0\}$

Select one:

☐ True

☒ False



Question 8

Not yet answered

Marked out of 1.0

Flag question

If the augmented matrix of a system of linear equations has a pivot in every column, then the system has infinitely many solution.

Select one:

☐ True

☒ False



Question 15

Not yet answered

Marked out of 1.0

Flag question

Let $A_{5 \times 5}$ and $B_{5 \times 5}$, then $(AB)^{-1} = B^{-1}A^{-1}$.

Select one:

☐ True

☐ False



Question 16

Not yet answered

Marked out of 1.0

Flag question

Suppose A is a 3×3 matrix with $A \begin{bmatrix} 1 \\ 4 \\ -2 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$, then A invertible

Select one:

☐ True

☐ False



Question **21**

Not yet
answered

Marked out of
1.0

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question

If two $n \times n$ matrices have the same determinant, they are similar.

Select one:

☐ True

☐ False



Question **22**

Not yet
answered

Marked out of
1.0

Flag
question

Non zero eigenvectors corresponding to distinct eigenvalues are linearly independent.

Select one:

☐ True

☐ False



Question 19

Not yet answered

Marked out of 1.0

Flag question

For a any scalar and u and v any vector in a vector space V , $(au)v = a(uv)$

Select one:

☒ True

☐ False

Question 20

Not yet answered

Marked out of 1.0

Flag question

If A_θ is a rotation matrix, then $A_\theta^T = A_\theta^{-1}$

Select one:

☒ True

☐ False

Question 35

Not yet answered

Marked out of 1.0

Flag question

If $\{v_1, v_2, v_3\}$ are linearly independent vectors in some vector space V , then they form a basis of V .

Select one:

☐ True

☒ False



Question 36

Not yet answered

Marked out of 1.0

Flag question

If a matrix A has a pivot in every row, then A is invertible.

Select one:

☐ True

☒ False



Question 27

Not yet answered

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Flag question

Let E_2 be an eigenspace of the matrix A . Let $\vec{v}$ be a nonzero vector in E_2 . Then $A\vec{v} = 2\vec{v}$

Select one:

☒ True

☐ False

Question 28

Not yet answered

Marked out of 1.0

Flag question

If two matrices have the same characteristic polynomial, then they have the same eigenvectors.

Select one:

☐ True

☒ False

Question 29

Not yet answered

Marked out of 1.0

Flag question

If A is 4×7 matrix has four pivot columns, then $\text{Row } A = \mathbb{R}^4$.

Select one:

☒ True

☐ False

Question 30

Not yet answered

Marked out of 1.0

Flag question

If A and B are skew Symmetric matrices, then AB is also skew symmetric.

Select one:

☐ True

☒ False

Question 23

Not yet
answered

Marked out of
1.0

Flag
question

Let $\{v_1, v_2, v_3, v_4\}$ be Linearly independent set.
Which of the following is Linearly dependent?

Select one:

- ☒ a. $\{v_1 - v_2, v_2 - v_3, v_3 - v_4, v_1 - v_4\}$
- ☐ b. Non of the mentioned
- ☐ c. $\{v_1 + v_3, v_2 + v_4, v_2, v_1 - v_4\}$
- ☐ d. $\{v_1, v_1 + v_2, v_1 + v_2 + v_3, v_1 + v_2 + v_3 + v_4\}$

Question 24

Not yet
answered

Marked out of
1.0

Flag
question

Which of the following is Linearly dependent?

Select one:

- ☐ a. $\{\tan^2 t, \sec^2 t, t\}$
- ☐ b. $\{t, t \sin t, t \cos t\}$
- ☐ c. Non of the mentioned
- ☐ d. $\{\sin^2 t, \cos^2 t, 1\}$

Question 23

Not yet
answered

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1.0

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question

Let $\{v_1, v_2, v_3, v_4\}$ be Linearly independent set.
Which of the following is Linearly dependent?

Select one:

- ☐ a. $\{v_1 - v_2, v_2 - v_3, v_3 - v_4, v_1 - v_4\}$
- ☐ b. Non of the mentioned
- ☐ c. $\{v_1 + v_3, v_2 + v_4, v_2, v_1 - v_4\}$
- ☐ d. $\{v_1, v_1 + v_2, v_1 + v_2 + v_3, v_1 + v_2 + v_3 + v_4\}$

Question 24

Not yet
answered

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1.0

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question

Which of the following is Linearly dependent?

Select one:

- ☐ a. $\{\tan^2 t, \sec^2 t, t\}$
- ☐ b. $\{t, t \sin t, t \cos t\}$
- ☐ c. Non of the mentioned
- ☐ d. $\{\sin^2 t, \cos^2 t, 1\}$

Question 20

Not yet
answered

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1.0

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question

Which of the following are subspaces of the indicated vector space:

$W = \{\mathbf{x} \in \mathcal{R}^2 \mid A\mathbf{x} = 3\mathbf{x}\}$, and A is a 2×2 matrix.

$U = \left\{ \mathbf{x} \in \mathcal{R}^2 \mid A\mathbf{x} = \begin{bmatrix} 2 \\ 0 \end{bmatrix} \right\}$, and A is a 2×2 matrix,

Select one:

- ☒ a. Only U is a subspace
- ☐ b. Both W and U are subspaces
- ☐ c. Only W is a subspace
- ☐ d. Neither W nor U are subspaces

Question 21

Not yet
answered

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1.0

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question

$$\text{Let } A = \begin{bmatrix} r & 0 & 1 \\ 4 & -r & 0 \\ 0 & 5 & 4 \end{bmatrix}.$$

What is the value of r such that $\text{trac} A = \det A$?

Select one or more:

☐ 0

☒ 2

☒ -2

☐ No answer

☐ 1

☐ -3

☐ 3

Question 17

Not yet answered

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Flag question

Let A, B, C be square invertible matrices satisfying $BAB = CB$. Assume that $\det B = -3$ and $\det C = 6$. Find a formula for A and calculate the determinant of A ?

Select one:

- ☐ a. $A = CB, \det A = -18$
- ☐ b. Non of the mentioned.
- ☐ c. $A = CB^{-1}, \det A = -2$
- ☐ d. $A = B^{-1}C, \det A = 3$
- ☐ e. $A = B^{-1}C, \det A = -2$

Question 18

Not yet answered

Marked out of 1.0

Flag question

If a matrix A has a characteristic polynomial $(t - 1)(t^2 + 9)(t^2 - 25)$, then the real eigenvalues are

Select one or more:

- ☐ 3
- ☐ Not enough information.

- ☒ 1
- ☒ -5
- ☒ 5
- ☐ -3

Question 17

Not yet
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Select one:

- ☐ a. $A = CB, \det A = -18$
- ☐ b. Non of the mentioned.
- ☐ c. $A = CB^{-1}, \det A = -2$
- ☐ d. $A = B^{-1}C, \det A = 3$
- ☒ $A = B^{-1}C, \det A = -2$

Question 18

Not yet
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1.0Flag
question

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Select one or more:

- ☐ 3
- ☐ Not enough information.
- ☐ 1
- ☐ -5
- ☐ 5
- ☐ -3

Question 6

Not yet
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1.0Flag
question

Suppose A is a 3×3 matrix with columns $\mathbf{v}_1, \mathbf{v}_2$ and $\mathbf{v}_3$:

$$A = \begin{bmatrix} | & | & | \\ \mathbf{v}_1 & \mathbf{v}_2 & \mathbf{v}_3 \\ | & | & | \end{bmatrix}$$

and $\text{Nul}(A) = \text{Span} \left\{ \begin{bmatrix} 0 \\ -2 \\ 0 \end{bmatrix} \right\}$. Are the columns of A linearly dependent, and if so, what is a nontrivial dependence relation between them?

Select one:

- ☐ a. The columns of A are linearly dependent, but neither of the above options is a nontrivial dependence relation
- ☐ b. The columns of A are linearly dependent and $\mathbf{v}_1 - 2\mathbf{v}_2 + \mathbf{v}_3 = \mathbf{0}$
- ☐ c. The columns of A are linearly independent
- ☐ d. The columns of A are linearly dependent and a dependence relation is

$$0\mathbf{v}_1 + 0\mathbf{v}_2 + 0\mathbf{v}_3 = \mathbf{0}$$

- ☐ e. Not enough information to tell

Question 14

Not yet answered

Marked out of 1.0

Flag question

If $\mathcal{B} = \left\{ \begin{bmatrix} 2 \\ -1 \\ 1 \end{bmatrix}, \begin{bmatrix} -1 \\ 0 \\ 1 \end{bmatrix}, \begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix} \right\}$ be a basis and the $\mathcal{B}$ -coordinate vector of v is $[\mathbf{v}]_{\mathcal{B}} = \begin{bmatrix} 2 \\ 1 \\ -3 \end{bmatrix}$. Find v ?

Select one:

☐ a. $\begin{bmatrix} 5 \\ -5 \\ 3 \end{bmatrix}$

☐ b. $\begin{bmatrix} -1 \\ 3 \\ 2 \end{bmatrix}$

☐ c. $\begin{bmatrix} -1 \\ 3 \\ -2 \end{bmatrix}$

☐ d. Non of the mentioned

☒ e. $\begin{bmatrix} 3 \\ -5 \\ -3 \end{bmatrix}$

Question 15

Not yet answered

Marked out of 1.0

Flag question

$$\text{Let } A = \begin{bmatrix} 1 & 1 & -1 \\ 0 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}$$

Which of the following vectors belong to $\text{Null } A$?

Select one:

☐ a. $\begin{bmatrix} 1 \\ 3 \\ 0 \end{bmatrix}$

☐ b. $\begin{bmatrix} -2 \\ 2 \\ 2 \end{bmatrix}$

☐ c. Non of the mentioned

☒ d. $\begin{bmatrix} 3 \\ -3 \\ 0 \end{bmatrix}$

☐ e. $\begin{bmatrix} 0 \\ 1 \\ -1 \end{bmatrix}$

Question 13

Not yet answered

Marked out of 1.0

Flag question

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

What is the determinant of $A^T A^{-1} A^T$?

Answer:

16

Question 14

Not yet answered

Marked out of 1.0

Flag question

If $\mathcal{B} = \left\{ \begin{bmatrix} 2 \\ -1 \\ 1 \end{bmatrix}, \begin{bmatrix} -1 \\ 0 \\ 1 \end{bmatrix}, \begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix} \right\}$ be a basis and the $\mathcal{B}$ -coordinate vector of v is $[v]_{\mathcal{B}} = \begin{bmatrix} 2 \\ 1 \\ -3 \end{bmatrix}$. Find v ?

Select one:

☐ a. $\begin{bmatrix} 5 \\ -5 \\ 3 \end{bmatrix}$

☐ b. $\begin{bmatrix} -1 \\ 3 \\ 2 \end{bmatrix}$

☐ c. $\begin{bmatrix} -1 \\ 3 \end{bmatrix}$

Question 16

Not yet
answered

Marked out of
1.0

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question

Which of the following is **NOT** a subspace of the vector space $M_{2 \times 2}$

Select one:

- ☐ a. $W =$ The set of all symmetric matrices $M_{2 \times 2}$.
- ☐ b. Non of the mentioned
- ☐ c. $W = \left\{ \begin{bmatrix} a & b \\ -b & c \end{bmatrix} : \text{All matrices in } M_{2 \times 2} \text{ where } a, b, c \in \mathbb{R} \right\}$
- ☒ d. $W = \left\{ \begin{bmatrix} a & b \\ 0 & c \end{bmatrix} : \text{All matrices in } M_{2 \times 2} \text{ where } a > 3b - c \right\}$
- ☐ e. $W = \left\{ \begin{bmatrix} a & b \\ c & d \end{bmatrix} : \text{All matrices in } M_{2 \times 2} \text{ where } a = -c \right\}$

Question 19

Not yet
answered

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1.0

Flag
question

For a matrix A we have that $\left(A \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}\right)^T = \begin{bmatrix} 1 & 0 \\ 2 & 1 \end{bmatrix}$

Find the first column of A ?

Select one:

☐ a. there is no enough information.

☐ b. $\begin{bmatrix} 0 \\ 1 \end{bmatrix}$

☒ c. $\begin{bmatrix} 1 \\ 0 \end{bmatrix}$

☐ d. $\begin{bmatrix} 0 \\ -\frac{1}{2} \end{bmatrix}$

☐ e. $\begin{bmatrix} 0 \\ 0 \end{bmatrix}$

☐ f. $\begin{bmatrix} 0 \\ 2 \end{bmatrix}$

Question 22

Not yet
answered

Marked out of
1.0

Flag
question

Let W be the subspace of lower triangular matrices in $M_{6 \times 6}$.
What is the dimension W ?

Answer:

21

Question 25

Not yet answered

Marked out of 1.0

Flag question

For which values of x is the matrix $A = \begin{bmatrix} 1 & x & 2 \\ -1 & 1 & 1 \\ -1 & 5 & x+1 \end{bmatrix}$ not invertible?

Select one or more:

☒ -4

☐ 2

☒ 3

☐ 12

☐ -1

☐ The matrix is invertible for all values x .