Started on	Friday, 1 January 2021, 2:30 PM
State	Finished
Completed on	Friday, 1 January 2021, 2:45 PM
Time taken	14 mins 52 secs
Grade	**7.00** out of 10.00 (**70**%)

Question **1**

Incorrect

Mark 0.00 out of 1.00

Let $A = \begin{pmatrix} 0 & -2 \\ 2 & 0 \end{pmatrix}$. Which of the following is the correct geometric interpretation of the associated linear transformation?

a. rotates clockwise through 90 degrees and doubles the length.

b. rotates counterclockwise through 90 degrees and halves the length. ✖

c. rotates counterclockwise through 90 degrees and doubles the length.

d. rotates clockwise through 90 degrees and halves the length.

The correct answer is:

rotates counterclockwise through 90 degrees and doubles the length.

Question **2**

Correct

Mark 1.00 out of 1.00

Which of the following sets of vector span $\mathbb{R}^3$?

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

b. $\{\begin{bmatrix}-1\\2\\3\end{bmatrix},\begin{bmatrix}2\\1\\-1\end{bmatrix},\begin{bmatrix}4\\7\\3\end{bmatrix}\}.$

c. $\{\begin{bmatrix}1\\0\\2\end{bmatrix},\begin{bmatrix}0\\1\\0\end{bmatrix},\begin{bmatrix}-1\\3\\0\end{bmatrix},\begin{bmatrix}1\\-4\\1\end{bmatrix}\}.$ ✔

d. $\{\begin{bmatrix}1\\1\\0\end{bmatrix},\begin{bmatrix}0\\1\\-2\end{bmatrix},\begin{bmatrix}1\\3\\1\end{bmatrix}\}.$ ✔

The correct answers are:

$\{\begin{bmatrix}1\\1\\0\end{bmatrix},\begin{bmatrix}0\\1\\-2\end{bmatrix},\begin{bmatrix}1\\3\\1\end{bmatrix}\}.$

,

$\{\begin{bmatrix}1\\0\\2\end{bmatrix},\begin{bmatrix}0\\1\\0\end{bmatrix},\begin{bmatrix}-1\\3\\0\end{bmatrix},\begin{bmatrix}1\\-4\\1\end{bmatrix}\}.$

Question **3**

Correct

Mark 1.00 out of 1.00

Let $T : \mathbb{R}^2 \longrightarrow \mathbb{R}^2$ be a linear transformation given by $T(\begin{bmatrix}1\\1\end{bmatrix}) = \begin{bmatrix}-3\\-3\end{bmatrix}, T(\begin{bmatrix}2\\1\end{bmatrix}) = \begin{bmatrix}4\\2\end{bmatrix}$.

Find $T(\begin{bmatrix}4\\3\end{bmatrix})$

a. $\begin{bmatrix}2\\4\end{bmatrix}$

b. $\begin{bmatrix}0\\-4\end{bmatrix}$

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

d. $\begin{bmatrix}-2\\-4\end{bmatrix}$ ✔

The correct answer is: $\begin{bmatrix}-2\\-4\end{bmatrix}$

Question **4**

Correct

Mark 1.00 out of 1.00

The set $\{u, v\} \subseteq \mathbb{R}^2$ is linearly independent if and only if $\{u + v, u - v\}$ is linearly independent.

Select one:

True ✔

False

The correct answer is 'True'.

Question **5**

Incorrect

Mark 0.00 out of 1.00

A set of three vectors is linearly dependent only if one of them is a scalar multiple of another.

Select one:

- True ✖
- False

The correct answer is 'False'.

Question **6**

Correct

Mark 1.00 out of 1.00

If $\{v_1, v_2, v_3, v_4\}$ are in $\mathbb{R}^4$ and v_4 is not a linear combination of $\{v_1, v_2, v_3\}$, then $\{v_1, v_2, v_3, v_4\}$ must be linearly independent.

Select one:

- True
- False ✔

The correct answer is 'False'.

Question **7**

Incorrect

Mark 0.00 out of 1.00

A finite set of vectors is linearly independent iff its every proper finite subset is linearly independent.

Select one:

- True ✖
- False

The correct answer is 'False'.

Question **8**

Correct

Mark 1.00 out of 1.00

Let A, b be given. Then $AX = b$ has infinitely many solutions if and only if $AX = 0$ has infinitely many solutions.

Select one:

- True
- False ✔

The correct answer is 'False'.

Question **9**

Correct

Mark 1.00 out of 1.00

$T : \mathbb{R}^2 \longrightarrow \mathbb{R}^2$ defined by $T(\begin{bmatrix} x_1 \\ x_2 \end{bmatrix}) = \begin{bmatrix} x_1 + x_2 \\ x_1 - x_2 + 1 \end{bmatrix}$ is a linear transformation.

Select one:

- True
- False ✔

The correct answer is 'False'.

Question **10**

Correct

Mark 1.00 out of 1.00

Let $T : \mathbb{R}^3 \longrightarrow \mathbb{R}^3$ be the function that sends $T\begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} x_3 + x_1 \\ x_1 . x_2 \\ 3x_3 \end{bmatrix}$. Is T a linear transformation?

Select one:

- True
- False ✔

The correct answer is 'False'.

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