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Started on	Tuesday, October 18, 2022, 7:49 PM
State	Finished
Completed on	Tuesday, October 18, 2022, 8:02 PM
Time taken	12 mins 9 secs
Points	21.00/21.00
Grade	**10.00** out of 10.00 (**100**%)

Question **1**

Correct

1.00 points out of 1.00

For any vector space V, the set containing only its zero vector is a subspace of V.

Select one:

◉ True ✔

◯ False

Question **2**

Correct

2.00 points out of 2.00

Consider the vector space of all n x n matrices with standard addition and scalar multiplication. The subset of n x n matrices for which all entries are greater than or equal to zero is a subspace of this vector space.

Select one:

◯ True

◉ False ✔

Question **3**

Correct

2.00 points out of 2.00

The vector $(4, 4, 5)$ is a linear combination of the vectors $(1, 2, 1)$ and $(2, 0, 3)$.

Select one:

○ True ✔

○ False

Question **4**

Correct

1.00 points out of 1.00

What is required to verify that a subset W of a vector space V is a subspace?

○ Verify that W satisfies the commutative and associative properties.

○ Verify all 10 properties from the definition of a vector space.

○ Verify that W has a zero vector and a negative vector.

○ Verify that W is in fact a subset of V.

◉ Verify that the two closure properties hold.   ✔

Question **5**

Correct

2.00 points out of 2.00

W is the subset of R^3 consisting of vectors of the form (a, b, c) where $c = ab$, with standard addition and scalar multiplication. Is W a subspace of R^3?

Select one:

◉ No. W is not closed under either vector addition or scalar multiplication.   ✔

○ Yes, because W is closed under both vector addition and scalar multiplication.

○ No. While W is closed under vector addition, it is not closed under scalar multiplication.

○ Yes, because W is not closed under either vector addition or scalar multiplication.

○ No. While W is closed under scalar multiplication, it is not closed under scalar addition.

Question **6**

Correct

2.00 points out of 2.00

W is the subset of R^3 consisting of vectors of the form (a, b, c) where $c = a + b$, with standard addition and scalar multiplication. Is W a subspace of R^3?

Select one:

○   No. While W is closed under vector addition, it is not closed under scalar multiplication.

○   Yes, because W is not closed under either vector addition or scalar multiplication.

◉   Yes, because W is closed under both vector addition and scalar multiplication.   ✔

○   No. W is not closed under either vector addition or scalar multiplication.

○   No. While W is closed under scalar multiplication, it is not closed under scalar addition.

Question **7**

Correct

1.00 points out of 1.00

If $S = \{w_1, w_2, \ldots, w_r\}$ is a nonempty set of vectors in a vector space **V**, then the set **W** of all possible linear combinations of the vectors in **S** is a subspace of **V**.

Select one:

◉ True ✔

○ False

Question **8**

Correct

1.00 points out of 1.00

Consider the vector space of all n x n matrices with standard addition and scalar multiplication. The subset of n x n matrices whose trace is zero is a subspace of this vector space.

Select one:

◉ True ✔

○ False

Question **9**

Correct

2.00 points out of 2.00

The vectors $(1, -1, 1)$, $(1, 0, 1)$, and $(0, 0, 2)$ span R^3.

Select one:

◉ True ✔

○ False

Question **10**

Correct

2.00 points out of 2.00

The matrix $\begin{bmatrix} 7 & 10 \\ 0 & -2 \end{bmatrix}$ is a linear combination of the matrices $\begin{bmatrix} 1 & 2 \\ 0 & 0 \end{bmatrix}$ and $\begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix}$ because

$\begin{bmatrix} 7 & 10 \\ 0 & -2 \end{bmatrix}$ = $\boxed{5}$ ✔ $\begin{bmatrix} 1 & 2 \\ 0 & 0 \end{bmatrix}$ + $\boxed{-2}$ ✔ $\begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix}$.

Question **11**

Correct

2.00 points out of 2.00

The polynomial $p = 2x^2 + 11x + 1$ is a linear combination of $p_1 = 2 - x$, $p_2 = 1 + x^2$, and $p_3 = 3x - x^2$ because

$p =$ $\boxed{-2}$ ✔ $p_1 +$ $\boxed{5}$ ✔ $p_2 +$ $\boxed{3}$ ✔ p_3.

Question **12**

Correct

1.00 points out of 1.00

The solution set of a homogeneous linear system $Ax = 0$ of m equations in n unknowns is a subspace of R^n.

Select one:

◉ True ✔

○ False

Question **13**

Correct

2.00 points out of 2.00

Suppose V is the set of all ordered pairs with standard addition and scalar multiplication. Let W be the subset of V that just contains points on a certain line. W will be a subspace of V if which of the following is true?

Select one:

○ The line has a positive y-intercept.

○ The line has a positive slope.

○ The line is vertical.

◉ The line goes through the origin.   ✔

○ The line is horizontal.

◄ Section 3.3 - Using the Projection Theorem

Jump to...

Linear Combinations