Started on	Friday, 9 April 2021, 10:00:51 AM
State	Finished
Completed on	Friday, 9 April 2021, 10:50:52 AM
Time taken	50 mins 1 sec
Grade	**14.00** out of 20.00 (**70**%)

Question **1**

Correct

Mark 1.00 out of 1.00

If a matrix A is in row echelon form, the column vectors containing non zero leading terms of the row vectors form a basis for the column space of A .

Select one:

- True ✔
- False

The correct answer is 'True'.

Question **2**

Correct

Mark 1.00 out of 1.00

Drag the correct answer.

Let $T\colon \mathbb{R} \to \mathbb{R}^2$ be the mapping such that $T(t) = (e^t,\ t)$. Then the value of $(2\ T)(0) =$ (2,0) ✔

(0,0) (0,2)

The correct answer is:
Drag the correct answer.

Let $T\colon \mathbb{R} \to \mathbb{R}^2$ be the mapping such that $T(t) = (e^t,\ t)$. Then the value of $(2\ T)(0) =$ [(2,0)]

Question **3**

Incorrect

Mark 0.00 out of 1.00

Any set of generating vectors in a vector space can be extended to a basis.

Select one:

- True ✖
- False

The correct answer is 'False'.

Question **4**

Correct

Mark 1.00 out of 1.00

Let W be the subspace of dimension 1432 of vector space $\mathbb{R}^{2021}$, Then the dimension of subspace $W\perp$ is

Answer: 589 ✔

The correct answer is: 589

Question **5**

Correct

Mark 1.00 out of 1.00

True or False

Let $n \geq 0$ be an odd integer, then every $n \times n$ matrix has at least one real eigenvalue.

Select one:

- True ✔
- False

The correct answer is 'True'.

Question **6**

Correct

Mark 2.00 out of 2.00

The intersection of the plane given by x + y + z +1 = 0 and x + 2y + 3z + 4 = 0 is

Select one or more:

- (x,y,z) = (t+3 , 2t , t)
- (x,y,z) = (t , -2t-3 , t +7)
- (x,y,z) = (t+2 , -2t-3 , t) ✔

The correct answer is: (x,y,z) = (t+2 , -2t-3 , t)

Question **7**

Partially correct

Mark 1.50 out of 2.00

Select the correct answer: True or False.

True	False		
✖	✖	This choice was deleted after the attempt was started.	✖
✖	✔	A homogeneous system of linear equations with fewer unknowns than equations has a nonzero solution.	✖
✖	✔	Let $S\colon \mathbb{R}^3 \to \mathbb{R}$ be a mapping defined by $S(x,y,z)=\lvert x+y+z\rvert$, then S is linear map.	✔
✖	✖	This choice was deleted after the attempt was started.	✖

This choice was deleted after the attempt was started.: False
A homogeneous system of linear equations with fewer unknowns than equations has a nonzero solution.: False
Let $S\colon \mathbb{R}^3 \to \mathbb{R}$ be a mapping defined by $S(x,y,z)=\lvert x+y+z\rvert$, then S is linear map.
: False
This choice was deleted after the attempt was started.: False

Question **8**

Partially correct

Mark 1.50 out of 2.00

Let $L:\mathbb{R}^4 \to \mathbb{R}^2$ be a linear map defined by $L(x_1, x_2, x_3, x_4) = (2x_1 - x_3, x_3 + 2x_2 - x_1)$. Let A be the matrix of L.

Kernel of L is span{(2,-1,4,0), (0,0,0,1)} ✔ .

Image of L is span{(0,1), (0,2)} ✖ .

Dimension of row space of A is the same as the dimension of the image of L. ✔ .

Dimension of null space of A is 2 ✔ .

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

span{(2,0,-1,0), (-1,2,1,0)}	span{(-1,0.5,-2,1)}
the same as the dimension of the domain space.	1

The correct answer is:

Let $L:\mathbb{R}^4 \to \mathbb{R}^2$ be a linear map defined by $L(x_1, x_2, x_3, x_4) = (2x_1 - x_3, x_3 + 2x_2 - x_1)$. Let A be the matrix of L.

Kernel of L is [span{(2,-1,4,0), (0,0,0,1)}].

Image of L is [span{(2,-1), (0,2), (2,2)}].

Dimension of row space of A is [the same as the dimension of the image of L.].

Dimension of null space of A is [2].

Question **9**

Incorrect

Mark 0.00 out of 2.00

Let $T:\mathbb{R}^2 \to \mathbb{R}^3$ be a linear map defined as $T(x, y) = (x + 3y, 2x + 5y, 7x + 9y)$, Matrix associated with map T with respect to the ordered basis $\{(1, 0), (1, 1)\}$ of $\mathbb{R}^2$ and the ordered basis $\{(1, 1, 0), (1, 1, 1), (1, 0, 0)\}$ of $\mathbb{R}^3$ is

- $\begin{bmatrix} -5 & 7 & -1 \\ -9 & 16 & -3 \end{bmatrix}$
- $\begin{bmatrix} -9 & -5 \\ 16 & 7 \\ -3 & -1 \end{bmatrix}$ ✖
- $\begin{bmatrix} -9 & 16 & -3 \\ -5 & 7 & -1 \end{bmatrix}$
- $\begin{bmatrix} -5 & -9 \\ 7 & 16 \\ -1 & -3 \end{bmatrix}$

The correct answer is: $\begin{bmatrix} -5 & -9 \\ 7 & 16 \\ -1 & -3 \end{bmatrix}$

Question **10**

Correct

Mark 2.00 out of 2.00

Let $A=\begin{pmatrix}-1 & 2 & 0\\ -6 & 6 & 0\\ 0 & 0 & 3\end{pmatrix}$. The sum of dimensions of eigenspaces of the two smallest eigenvalues of A is...

Answer: 3 ✔

The correct answer is: 3

Question **11**

Correct

Mark 2.00 out of 2.00

Select **all the correct** statement(s).

Following maps are defined from $\mathbb{R}^3$ to $\mathbb{R}^2$

$F(x,\ y,\ z)=(100,\ x+y)$

$G(x,\ y,\ z)=(xy,\ x+y)$

$H(x,\ y,\ z)=(z-x,\ x+y)$

$I(x,\ y,\ z)=(|x|,\ y+z)$.

Select one or more:

- [ ] H and G are linear maps and F and I are not linear.
- [x] H is linear while F, G and I are not linear maps. ✔
- [x] Only H is a linear map. ✔
- [ ] Only G is a linear map.
- [x] F, G and I are the only maps that are not linear. ✔
- [ ] H and G are not linear while F and I are linear maps.

The correct answers are: Only H is a linear map., H is linear while F, G and I are not linear maps., F, G and I are the only maps that are not linear.

Question **12**

Partially correct

Mark 1.00 out of 3.00

Let A be an $n \times n$ matrix with real entries.

Match the following by dragging the options to their correct places

A and A^t: same eigenvalues ✔

The product of eigenvalues of A: det(A) ✔

If A is invertible then eigenvectors : all eigenvalues are real ✖

$A - A^t$: solutions of the system AX=0 ✖

AA^t: in column space of A ✖

Eigenvectors of the matrix $A = 0$: 0 is the only real eigenvalue ✖

all vectors in R^n | trace of A | same eigenvectors | all non-zero vectors in R^n | in row space of A

The correct answer is:

Let A be an $n \times n$ matrix with real entries.

Match the following by dragging the options to their correct places

A and A^t: [same eigenvalues]

The product of eigenvalues of A: [det(A)]

If A is invertible then eigenvectors : [in column space of A]

$A - A^t$: [0 is the only real eigenvalue]

AA^t:[all eigenvalues are real]

Eigenvectors of the matrix $A = 0$: [in row space of A]

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