



Exam : Quiz 2
Subject : Maths2
Total Marks : 25.00
QP : 2024 Aug04: IIT M AN EXAM QIM4

Exam Mode

Learning Mode

QUESTION MENU

1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18
19	20	21	22	23	24	25	26	

TIMER

00:30



CONTROLS

✓ SUBMIT EXAM

Your Score

0.00 / 25.00

(0%)

Question 1 : 640653857008

Total Mark : 0.00 | Type : MCQ

THIS IS QUESTION PAPER FOR THE SUBJECT "FOUNDATION LEVEL : MATHEMATICS FOR DATA SCIENCE II (COMPUTER BASED EXAM)" ARE YOU SURE YOU HAVE TO WRITE EXAM FOR THIS SUBJECT? CROSS CHECK YOUR HALL TICKET TO CONFIRM THE SUBJECTS TO BE WRITTEN. (IF IT IS NOT THE CORRECT SUBJECT, PLS CHECK THE SECTION AT THE TOP FOR THE SUBJECTS REGISTERED BY YOU)

OPTIONS :

YES NO

Your score : 0

Discussions (0)

**Question 2 : 640653857009**

View Solutions (0)

Total Mark : 2.00 | Type : MCQ



Let $A = \begin{bmatrix} x & -4 \\ 3 & y \end{bmatrix}$ and $T : \mathbb{R}^2 \rightarrow \mathbb{R}$ be a linear transformation given by

$T(x, y) = \text{trace}(A)$. Recall that the trace of a matrix is the sum of its diagonal elements (the one going from top-left to bottom right). Which of the following statements is true?

OPTIONS :

- T is injective but not surjective.
- T is surjective but not injective.
- T is an isomorphism.
- T is neither injective nor surjective.

Your score : 0

Discussions (0)

**Question 3 : 640653857010**

View Solutions (0)

Total Mark : 2.00 | Type : MCQ



Consider the following matrices:

$$P = \frac{1}{5} \begin{bmatrix} 3 & 4 \\ -4 & 3 \end{bmatrix}, \quad Q = \frac{1}{5} \begin{bmatrix} 3 & -4 \\ 4 & 3 \end{bmatrix}$$

Let A be any 2×2 matrix and $B = PAQ$. Which of the following statements is true?

OPTIONS :

- A and B are similar matrices.
- A and B are equivalent matrices, but not similar.
- A and B are similar matrices, but not equivalent.
- A and B are not equivalent matrices.

Your score : 0

 Discussions (0)



Question 4 : 640653857011

 View Solutions (0)

Total Mark : 3.00 | Type : MSQ

Note : Two vector spaces are said to be isomorphic if we can define an isomorphism from one to the other.

Which of the following vector spaces is/are isomorphic to \mathbb{R}^2 ? 

OPTIONS :

$V_1 = \{(x, y, z) \in \mathbb{R}^3 \mid x + y + z = 0\}$. 

$V_2 = \text{span}\{(1, 0, 1), (1, 1, 0), (0, 1, 1)\}$. 

$V_3 = \left\{ \begin{bmatrix} a & b \\ c & d \end{bmatrix} \mid a + b = 0, c + d = 0; a, b, c, d \in \mathbb{R} \right\}$ 

$V_4 = \left\{ x \in \mathbb{R}^3 \mid Ax = 0 \text{ where } A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & -7 & 1 \\ 1 & 2 & 0 \end{bmatrix} \right\}$. 

V_5 is the column space of the matrix $\begin{bmatrix} 5 & -3 \\ 2 & 1 \end{bmatrix}$. 

Your score : 0

 Discussions (0)



Question 5 : 640653857012 View Solutions (0)

Total Mark : 3.00 | Type : MSQ

Select all true statement(s).

OPTIONS :

- For a matrix A of dimensions $m \times n$, the rank of the matrix is equal to the minimum of $\{m, n\}$. 
- The nullity of an invertible matrix is always zero. 
- For a matrix A of dimensions $m \times n$, the row space of A is the same as the column space of A . 
- If A and B are square matrices of order n such that $\text{rank}(AB) = n$, then both A and B must be invertible. 

Your score : 0

 Discussions (0)**Question 6 : 640653857013**

Total Mark : 0.00 | Type : COMPREHENSION

Based on the above data answer the given subquestions

Let $T : \mathbb{R}^2 \rightarrow \mathbb{R}^2$ be a linear transformation such that
 $A = \begin{bmatrix} 3 & 1 \\ 0 & 2 \end{bmatrix}$ is the matrix representation of T with respect
 to the ordered basis $\{(1, 1), (1, -1)\}$ for the domain and
 the standard ordered basis $\{(1, 0), (0, 1)\}$ for the co-domain.



Your score : 0



Question 7 :
640653857014

View Parent QN

View Solutions (0)

Total Mark : 2.00 | Type : MCQ

Which of the following matrices represent the matrix representation of T with respect to the standard ordered basis $\{(1, 0), (0, 1)\}$ for both the domain and co-domain?

OPTIONS :

- $$\begin{bmatrix} 2 & -1 \\ 1 & -1 \end{bmatrix}$$
- $$\begin{bmatrix} 1 & 2 \\ -1 & 1 \end{bmatrix}$$
- $$\begin{bmatrix} 2 & 1 \\ 1 & -1 \end{bmatrix}$$
- $$\begin{bmatrix} 2 & 1 \\ -1 & 1 \end{bmatrix}$$

Your score : 0

Discussions (0)


Question 8 :
640653857015

View Parent QN

View Solutions (0)

Total Mark : 1.00 | Type : MCQ

Which of the following defines the transformation T?

OPTIONS :

- $T(x, y) = (x + 2y, x + y)$
- $T(x, y) = (2x + y, x + y)$
- $T(x, y) = (2x - y, x - y)$

$T(x, y) = (2x + y, x - y)$ 

Your score : 0

 Discussions (0)**Question 9 :****640653857016**

View Parent QN



View Solutions (0)

Total Mark : 1.00 | Type : SA

What is the rank of T?

Answer (Numeric):

Answer

Accepted Answer : 2

Your score : 0

 Discussions (0)**Question 10 :****640653857017**

View Parent QN



View Solutions (0)

Total Mark : 1.00 | Type : SA

What is the nullity of T?

Answer (Numeric):

Answer

Accepted Answer : 0

Your score : 0

 Discussions (0)**Question 11 : 640653857018**

Total Mark : 0.00 | Type : COMPREHENSION

A and B are square matrices of order n. Determine whether the given statements are true or false. The given sub-questions are independent of each other. They have been grouped together because both are related to the concept of similar matrices.

Your score : 0

**Question 12 :****640653857019**

View Parent QN



View Solutions (0)

Total Mark : 1.00 | Type : MCQ

If A and B are similar matrices, then AT and BT are similar matrices.

OPTIONS :

 TRUE **FALSE**

Your score : 0

Discussions (0)

**Question 13 :****640653857020**

View Parent QN



View Solutions (0)

Total Mark : 1.00 | Type : MCQ

If A and B have the same rank, then they are similar.

OPTIONS :

 TRUE **FALSE**

Your score : 0

Discussions (0)



Question 14 : 640653857024

Total Mark : 0.00 | Type : COMPREHENSION

Let $W = \text{span}\{(1, 1, 0), (-1, 1, 0)\}$. The projection of $(1, 2, 3)$ on W is (a, b, c) . Based on the above data answer the given subquestions

Your score : 0

**Question 15 :****640653857025**

View Parent QN

View Solutions (0)

Total Mark : 0.50 | Type : SA

Find the value of a. _____

Answer (Numeric):

Answer

Accepted Answer : 1

Your score : 0

Discussions (0)

**Question 16 :****640653857026**

View Parent QN

View Solutions (0)

Total Mark : 0.50 | Type : SA

Find the value of b. _____

Answer (Numeric):

Answer

Accepted Answer : 2

Your score : 0

[Discussions \(0\)](#)**Question 17 :****640653857027**[View Parent QN](#)[View Solutions \(0\)](#)

Total Mark : 0.50 | Type : SA

Find the value of c. _____

Answer (Numeric):

Answer

Accepted Answer : 0

Your score : 0

[Discussions \(0\)](#)**Question 18 :****640653857028**[View Parent QN](#)[View Solutions \(0\)](#)

Total Mark : 0.50 | Type : SA

If the dimension of W is p and that of W^\perp is q , find the value of $p^2 + q^2$.

Answer (Numeric):

Answer

Accepted Answer : 5

Your score : 0

[Discussions \(0\)](#)**Question 19 : 640653857029**

Total Mark : 0.00 | Type : COMPREHENSION

Based on the above data answer the given subquestions

The columns of the matrix A defined below are orthonormal:

$$A = \frac{1}{a} \begin{bmatrix} 1 & -2 & 2 \\ 2 & -1 & -2 \\ 2 & b & c \end{bmatrix}$$

Your score : 0

**Question 20 :****640653857030**

View Parent QN

View Solutions (0)

Total Mark : 0.50 | Type : SA

Find the value of a._____

Answer (Numeric):

Answer

Accepted Answer : 3

Your score : 0

Discussions (0)

**Question 21 :****640653857031**

View Parent QN

View Solutions (0)

Total Mark : 0.50 | Type : SA

Find the value of b._____

Answer (Numeric):

Answer

Accepted Answer : 2

Your score : 0

[Discussions \(0\)](#)**Question 22 :****640653857032**[View Parent QN](#)[View Solutions \(0\)](#)

Total Mark : 0.50 | Type : SA

Find the value of c. _____

Answer (Numeric):

Answer

Accepted Answer : 1

Your score : 0

[Discussions \(0\)](#)**Question 23 :****640653857033**[View Parent QN](#)[View Solutions \(0\)](#)

Total Mark : 0.50 | Type : SA

If $A^T A + AA^T = kI$, where k is a scalar

and I is the identity matrix,

find the value of k . _____

Answer (Numeric):

Answer

Accepted Answer : 2

Your score : 0

[Discussions \(0\)](#)**Question 24 : 640653857021**

Total Mark : 0.00 | Type : COMPREHENSION

Based on the above data answer the given subquestions

Let S be the set of all solutions to the system $Ax = b$, 

where A and b are given below:

$$A = \begin{bmatrix} 1 & 0 & -1 \\ 0 & 1 & 0 \\ 0 & 0 & 0 \end{bmatrix}, \quad b = \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}$$

Your score : 0



Question 25 :

640653857022

View Parent QN

View Solutions (0)

Total Mark : 2.00 | Type : MSQ

Select all true statements.

OPTIONS :

- S is a vector subspace of \mathbb{R}^3
- S is an affine subspace of \mathbb{R}^3
- S is a line in \mathbb{R}^3
- S is a plane in \mathbb{R}^3

Your score : 0

Discussions (0)



Question 26 :

640653857023

View Parent QN

View Solutions (0)

Total Mark : 2.00 | Type : MSQ

Select all true statements.

OPTIONS :

- S is the empty set.

- S is a singleton set containing the zero vector.
- S = (1, 1, 0) + span{(1, 0, 1)}
- S = (0, 1, -1) + span{(1, 0, 1)}

Your score : 0

 Discussions (0)



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