Exam : Quiz 2
Subject : Maths2
Total Marks : 25.00
QP : 2023 Apr2: IIT M FOUNDATION AN4 EXAM 2

Exam Mode | Learning Mode

QUESTION MENU

1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17

TIMER

00:21

CONTROLS

SUBMIT EXAM

Your Score
0.00 / 25.00
(0%)

Question 1 : 640653520937

Total Mark : 0.00 | Type : MCQ

THIS IS QUESTION PAPER FOR THE SUBJECT "FOUNDATION LEVEL : SEMESTER 2: MATHEMATICS FOR DATA SCIENCE 2" 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 : 640653520952

View Solutions (1) Total Mark : 2.00 | Type : MCQ

Consider the vector space $V = \left\{ \begin{pmatrix} a & b \\ a & b \end{pmatrix} \mid a, b \in \mathbb{R} \right\}$ and $T : \mathbb{R}^3 \to V$ defined by $T(x, y, z) = \begin{pmatrix} x+y & x+y+z \\ x+y & x+y+z \end{pmatrix}$. Choose the correct option.

OPTIONS :

◯ T is onto but not one-one

◯ T is one-one but not onto.

◯ T is both one-one and onto

◯ T is neither one-one nor onto.

Your score : 0

Discussions (0)

Question 3 : 640653520953

View Solutions (1) Total Mark : 2.00 | Type : MSQ

Let A be an n × n orthogonal matrix. Choose the correct option(s).

OPTIONS :

☐ A is invertible.

☐ det(A) = ± 1.

☐ det(A) may be zero.

☐ Nullity of A may be 1.

Your score : 0

Discussions (0)

Question 4 : 640653520939

View Solutions (1) Total Mark : 3.00 | Type : MSQ

Which of the following options is/are true?

OPTIONS :

- [ ] If the rows of a 3×4 matrix A are linearly independent, then AAT is an invertiblematrix.
- [ ] If the columns of a 4 × 3 matrix A are linearly independent, then ATA is aninvertible matrix.
- [ ] If the rows of a 3 × 4 matrix A are linearly independent, then ATA is an invertiblematrix.
- [ ] If the columns of a 4 × 3 matrix A are linearly independent, then AAT is aninvertible matrix.

Your score : 0

Discussions (0)

Question 5 : 640653520948

View Solutions (1) Total Mark : 3.00 | Type : MSQ

An inner product on a vector space V is a function $\langle \cdot, \cdot \rangle : V \times V \to \mathbb{R}$ satisfying the following conditions:

Condition 1: $\langle v, v \rangle > 0$ for all $v \in V \setminus \{0\}$; $\langle v, v \rangle = 0$ if and only if $v = 0$.

Condition 2: $\langle v_1 + v_2, v_3 \rangle = \langle v_1, v_3 \rangle + \langle v_2, v_3 \rangle$, $\forall v_1, v_2, v_3 \in V$.

Condition 3: $\langle v_1, v_2 \rangle = \langle v_2, v_1 \rangle$, $\forall v_1, v_2 \in V$.

Condition 4: $\langle cv_1, v_2 \rangle = c\langle v_1, v_2 \rangle$, $\forall v_1, v_2 \in V$.

Let $V = \mathbb{R}^2$ and consider the function defined as:

$$\langle \cdot, \cdot \rangle : V \times V \to \mathbb{R}$$
$$\langle (x_1, x_2), (y_1, y_2) \rangle = x_1 y_1 - x_2 y_1 + x_2 y_2.$$

Which of the following is/are satisfied by the above function?

OPTIONS :

- [ ] Condition 1 is satisfied.
- [ ] Condition 2 is satisfied.

☐ Condition 3 is satisfied.

☐ Condition 4 is satisfied.

Your score : 0

Discussions (0)

Question 6 : 640653520938

View Solutions (0) Total Mark : 2.00 | Type : SA

Let $V = \left\{ \begin{pmatrix} a & b \\ c & d \end{pmatrix} \in M_{2\times 2}(\mathbb{R}) : a+b=c+d \right\}$ and $T : V \to \mathbb{R}^2$ be a linear transformation. If T is onto, what is the dimension of the kernel of T?

Answer (Numeric):

Answer

Accepted Answer : 1

Your score : 0

Discussions (0)

Question 7 : 640653520949

Total Mark : 0.00 | Type : COMPREHENSION

Based on the above data, answer the given subquestions.

Let W be the subspace of $\mathbb{R}^3$ with the standard inner product, spanned by the ordered set $\beta = \{(1,-1,0),(0,1,1)\}$.

Your score : 0

Question 8 :
640653520950

View Parent QN | View Solutions (0)

Total Mark : 2.00 | Type : SA

If $\{\frac{w_1}{\|w_1\|}, \frac{w_2}{\|w_2\|}\}$ denotes the orthonormal basis of W obtained by applying the Gram Schmidt process on β, what is $2\|w_2\|^2$?

Answer (Numeric):

Answer

Accepted Answer : 3

Your score : 0

Discussions (0)

Question 9 :
640653520951

View Parent QN | View Solutions (0)

Total Mark : 1.00 | Type : SA

Let P_W denote the projection of $\mathbb{R}^3$ onto W. If $P_W(1,0,1) = (a,b,c)$, what is $a+b+c$?

Answer (Numeric):

Answer

Accepted Answer : 2

Your score : 0

Discussions (0)

Question 10 : 640653520945

Total Mark : 0.00 | Type : COMPREHENSION

Based on the above data, answer the given subquestions.

Let $T : \mathbb{R}^2 \to \mathbb{R}^3$ be a linear transformation defined by $T(x, y) = (x + y, x - y, 3x + y)$.

Your score : 0

Question 11 :
640653520946

View Parent QN | View Solutions (0)

Total Mark : 2.00 | Type : SA

If $A = \begin{pmatrix} a & b \\ c & d \\ e & f \end{pmatrix}$ denotes the matrix of T with respect to $\{(1, 1), (1, -1)\}$ for $\mathbb{R}^2$ and $\{(1, 1, 1), (1, 1, 0), (-1, 0, 0)\}$ for $\mathbb{R}^3$, then what is $a + d + e$?

Answer (Numeric):

Answer

Accepted Answer : 2

Your score : 0

Discussions (0)

Question 12 :
640653520947

View Parent QN | View Solutions (0)

Total Mark : 2.00 | Type : MSQ

Let B denote the matrix of T with respect to the standard ordered bases for $\mathbb{R}^2$ and $\mathbb{R}^3$. Choose the correct option(s).

OPTIONS :

- [ ] A is equivalent to B.
- [ ] A is not equivalent to B.
- [ ] There exist two invertible matrices C and D such that BD = CA.
- [ ] There are no matrices C and D such that BD = CA.

Your score : 0

Discussions (0)

Question 13 : 640653520940

Total Mark : 0.00 | Type : COMPREHENSION

Consider the system of linear equations $AX = b$,

where $A = \begin{pmatrix} 1 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & -1 & 1 \end{pmatrix}$, $X = \begin{pmatrix} x \\ y \\ z \end{pmatrix}$ and $b = \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}$.

Let L denote the set of all solutions of the above system.

Clearly, L forms an affine space. Let W denote the subspace corresponding to L. Answer the **given sub** questions.

Your score : 0

Question 14 : 640653520941

View Parent QN | View Solutions (0)

Total Mark : 1.00 | Type : SA

What is the nullity of A?

Answer (Numeric):

Answer

Accepted Answer : 1

Your score : 0

Discussions (0)

Question 15 :
640653520942

View Parent QN | View Solutions (0)

Total Mark : 2.00 | Type : SA

What is the dimension of L?

Answer (Numeric):

Answer

Accepted Answer : 1

Your score : 0

Discussions (0)

Question 16 :
640653520943

View Parent QN | View Solutions (0)

Total Mark : 2.00 | Type : SA

Define $T : W \to \mathbb{R}^2$ by $T(x, y, z) = (0, x - z)$.
What is the rank of T?

Answer (Numeric):

Answer

Accepted Answer : 1

Your score : 0

Discussions (0)

Question 17 :
640653520944

View Parent QN | View Solutions (0)

Total Mark : 1.00 | Type : SA

If the $m \times n$ matrix B is the matrix of T with respect to some basis for W and the standard ordered basis for $\mathbb{R}^2$, then what is $m + n$?

Answer (Numeric):

Answer

Accepted Answer : 3

Your score : 0

Discussions (0)

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