Change Theme :	No
Help Button :	No
Show Reports :	No
Show Progress Bar :	No

Group I

Group Number :	1
Group Id :	64065312269
Group Maximum Duration :	0
Group Minimum Duration :	90
Show Attended Group? :	No
Edit Attended Group? :	No
Break time :	0
Group Marks :	700
Is this Group for Examiner? :	No
Examiner permission :	Cant View
Show Progress Bar? :	No
Revisit allowed for group Instructions? :	Yes
Maximum Instruction Time :	0
Minimum Instruction Time :	0
Group Time In :	Minutes
Navigate To Group Summary From Last Question? :	No
Disable Submit Button During Assessment? :	No
Section Selection Time? :	0
No of Optional sections to be attempted :	0

Maths2

Section Id :	64065333929
Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	9
Number of Questions to be attempted :	9
Section Marks :	25
Display Number Panel :	Yes
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	64065373899
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Number : 1 Question Id : 640653520978 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "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 :

6406531736542. ✔ YES

6406531736543. ✖ NO

Sub-Section Number : 2

Sub-Section Id : 64065373900

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 2 Question Id : 640653520993 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 2

Question Label : Multiple Choice Question

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 :

6406531736564. ✔ *T* is onto but not one-one

6406531736565. ✖ *T* is one-one but not onto.

6406531736566. ✖ *T* is both one-one and onto

6406531736567. ✖ *T* is neither one-one nor onto.

Sub-Section Number : 3

Sub-Section Id : 64065373901

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 3 Question Id : 640653520994 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 2 Selectable Option : 0

Question Label : Multiple Select Question

Let *A* be an $n \times n$ orthogonal matrix. Choose the correct option(s).

Options :

6406531736568. ✔ A is invertible.

6406531736569. ✔ det(A) = ± 1.

6406531736570. ✖ det(A) may be zero.

6406531736571. ✖ Nullity of A may be 1.

Sub-Section Number :	4
Sub-Section Id :	64065373902
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 4 Question Id : 640653520980 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3 Selectable Option : 0

Question Label : Multiple Select Question

Which of the following options is/are true?

Options :

6406531736545. ✔ If the rows of a 3×4 matrix A are linearly independent, then AA^T is an invertible matrix.

6406531736546. ✔ If the columns of a 4 × 3 matrix A are linearly independent, then A^TA is an invertible matrix.

6406531736547. ✖ If the rows of a 3 × 4 matrix A are linearly independent, then A^TA is an invertible matrix.

6406531736548. ✖ If the columns of a 4 × 3 matrix A are linearly independent, then AA^T is an invertible matrix.

Question Number : 5 Question Id : 640653520989 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3 Selectable Option : 0

Question Label : Multiple Select Question

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 :

6406531736558. ✔ Condition 1 is satisfied.

6406531736559. ✔ Condition 2 is satisfied.

6406531736560. ✖ Condition 3 is satisfied.

6406531736561. ✔ Condition 4 is satisfied.

Sub-Section Number :	5
Sub-Section Id :	64065373903
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 6 Question Id : 640653520979 Question Type : SA Calculator : None

Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 2

Question Label : Short Answer Question

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?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Sub-Section Number :	6
Sub-Section Id :	64065373904
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Id : 640653520990 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Question Numbers : (7 to 8)

Question Label : Comprehension

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

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 7 Question Id : 640653520991 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 2

Question Label : Short Answer Question

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 $2\|w_2\|^2$?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

3

Question Number : 8 Question Id : 640653520992 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Question Label : Short Answer Question

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

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

2

Sub-Section Number :	7
Sub-Section Id :	64065373905
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Id : 640653520986 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Question Numbers : (9 to 10)

Question Label : Comprehension

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

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 9 Question Id : 640653520987 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 2

Question Label : Short Answer Question

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 $a+d+e$?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

2

Question Number : 10 Question Id : 640653520988 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 2 Selectable Option : 0

Question Label : Multiple Select Question

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 :

6406531736554. ✔ *A* is equivalent to *B*.

6406531736555. ✖ *A* is not equivalent to *B*.

6406531736556. ✔ There exist two invertible matrices *C* and *D* such that *BD* = *CA*.

6406531736557. ✖ There are no matrices *C* and *D* such that *BD* = *CA*.

Sub-Section Number :	8
Sub-Section Id :	64065373906
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Id : 640653520981 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Question Numbers : (11 to 14)

Question Label : 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.

Sub questions

Question Number : 11 Question Id : 640653520982 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Question Label : Short Answer Question

What is the nullity of A?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 12 Question Id : 640653520983 Question Type : SA Calculator : None

Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 2

Question Label : Short Answer Question

What is the dimension of L?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 13 Question Id : 640653520984 Question Type : SA Calculator : None

Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 2

Question Label : Short Answer Question

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

What is the rank of T?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Question Number : 14 Question Id : 640653520985 Question Type : SA Calculator : None

Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Question Label : Short Answer Question

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 $m + n$?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

3

Statistics2

Section Id :	64065333930
Section Number :	2
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	12
Number of Questions to be attempted :	12
Section Marks :	40
Display Number Panel :	Yes
Group All Questions :	No
Enable Mark as Answered Mark for Review and	Yes