Question Number : 121 Question Id : 640653520588 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Question Label : Multiple Choice Question

Yesterday was not a great day, _____?

Options :

6406531735543. ✔ Was it

6406531735544. ✖ Were it

6406531735545. ✖ Wasn't it

6406531735546. ✖ Is it

Sem2 Maths2

Section Id :	64065333913
Section Number :	6
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 :	64065373798

Question Shuffling Allowed :   No

Is Section Default? :   null

Question Number : 122 Question Id : 640653520589 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 "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 :

6406531735547. ✔ YES

6406531735548. ✖ NO

Sub-Section Number :   2

Sub-Section Id :   64065373799

Question Shuffling Allowed :   Yes

Is Section Default? :   null

Question Number : 123 Question Id : 640653520604 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 :

6406531735569. ✔ *T* is onto but not one-one

6406531735570. ✖ *T* is one-one but not onto.

6406531735571. ✖ *T* is both one-one and onto

6406531735572. ✖ *T* is neither one-one nor onto.

Sub-Section Number : 3

Sub-Section Id : 64065373800

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 124 Question Id : 640653520605 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* × *n* orthogonal matrix. Choose the correct option(s).

Options :

6406531735573. ✔ *A* is invertible.

6406531735574. ✔ det(*A*) = ± 1.

6406531735575. ✖ det(*A*) may be zero.

6406531735576. ✖ Nullity of *A* may be 1.

Sub-Section Number : 4

Sub-Section Id : 64065373801

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 125 Question Id : 640653520591 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 :

6406531735550. ✔ If the rows of a 3×4 matrix A are linearly independent, then AA^T is an invertible matrix.

6406531735551. ✔ If the columns of a 4 × 3 matrix A are linearly independent, then A^TA is an invertible matrix.

6406531735552. ✖ If the rows of a 3 × 4 matrix A are linearly independent, then A^TA is an invertible matrix.

6406531735553. ✖ If the columns of a 4 × 3 matrix A are linearly independent, then AA^T is an invertible matrix.

Question Number : 126 Question Id : 640653520600 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 :

6406531735563. ✔ Condition 1 is satisfied.

6406531735564. ✔ Condition 2 is satisfied.

6406531735565. ✖ Condition 3 is satisfied.

6406531735566. ✔ Condition 4 is satisfied.

Sub-Section Number :	5
Sub-Section Id :	64065373802
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 127 Question Id : 640653520590 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 :	64065373803
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Id : 640653520601 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 : (128 to 129)

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 : 128 Question Id : 640653520602 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 : 129 Question Id : 640653520603 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 :   64065373804

Question Shuffling Allowed :   No

Is Section Default? :   null

Question Id : 640653520597 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 : (130 to 131)

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 : 130 Question Id : 640653520598 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 : 131 Question Id : 640653520599 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 :

6406531735559. ✔ *A* is equivalent to *B*.

6406531735560. ✖ *A* is not equivalent to *B*.

6406531735561. ✔ There exist two invertible matrices *C* and *D* such that *BD* = *CA*.

6406531735562. ✖ There are no matrices *C* and *D* such that *BD* = *CA*.

Sub-Section Number : 8

Sub-Section Id : 64065373805

Question Shuffling Allowed : No

Is Section Default? : null

Question Id : 640653520592 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 : (132 to 135)

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 : 132 Question Id : 640653520593 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 : 133 Question Id : 640653520594 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 : 134 Question Id : 640653520595 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 : 135 Question Id : 640653520596 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

Sem2 Statistics2

Section Id :	64065333914
Section Number :	7
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 Clear Response :	Yes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	64065373806
Question Shuffling Allowed :	No
Is Section Default? :	null