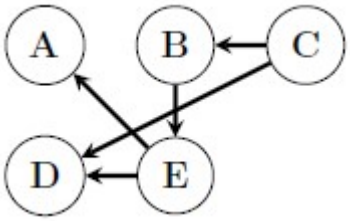
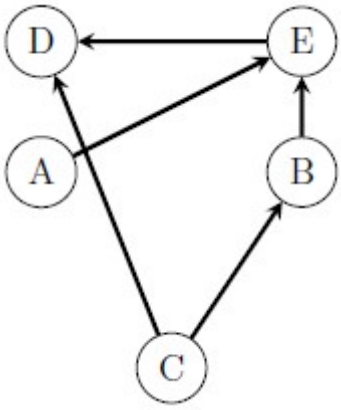
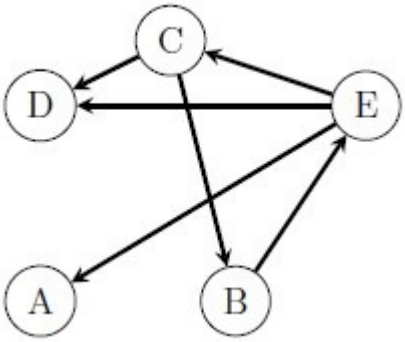
6406532730649. ✔



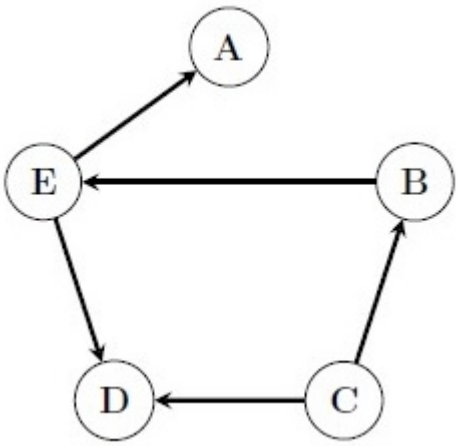
6406532730650. ✖



6406532730651. ✖



6406532730652. ✔



Section Id :	64065356654
Section Number :	4
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	15
Number of Questions to be attempted :	15
Section Marks :	50
Display Number Panel :	Yes
Section Negative Marks :	0
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 :	640653118652
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Number : 69 Question Id : 640653814996 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 II: 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 :

6406532730691. ✔ YES

6406532730692. ✖ NO

Sub-Section Number : 2

Sub-Section Id : 640653118653

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 70 Question Id : 640653815001 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

Let $S = \{v_1, v_2, v_3, v_4\}$ be a subset of $\mathbb{R}^3$. Select all true statements.

Options :

6406532730702. ✔ S is linearly dependent.

6406532730703. ✖ S is linearly independent.

6406532730704. ✖ Deleting any one element from S turns it into a basis.

6406532730705. ✖ $\text{span}(S) = \mathbb{R}^3$

Sub-Section Number : 3

Sub-Section Id : 640653118654

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 71 Question Id : 640653815022 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 2 Max. Selectable Options : 0

Question Label : Multiple Select Question

Let $f(x, y) = 2x^4 - 8\sqrt{y} - 7$. Choose the correct options from the following:

Options :

6406532730745. ✔ *f* is increasing at the point (1, 4), if *y* is fixed and *x* is varied.

6406532730746. ✖ *f* is decreasing at the point (1, 4), if *y* is fixed and *x* is varied.

6406532730747. ✔ *f* is decreasing at the point (1, 4), if *x* is fixed and *y* is varied.

6406532730748. ✖ None of these

Sub-Section Number :	4
Sub-Section Id :	640653118655
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 72 Question Id : 640653814997 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Let *A* and *B* be two square matrices of the same order. Select all true statements.

Options :

6406532730693. ✔ The i^{th} column of *AB* is a linear combination of the columns of *A*.

6406532730694. ✔ The i^{th} row of *AB* is a linear combination of the rows of *B*.

6406532730695. ✖ The i^{th} column of *AB* is a linear combination of the columns of *B*.

6406532730696. ✖ The i^{th} row of *AB* is a linear combination of the rows of *A*.

Question Number : 73 Question Id : 640653815002 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the matrix $A = \begin{bmatrix} a & b & b \\ a & a & b \\ a & a & a \end{bmatrix}$. If A is invertible, which of the following conditions must be satisfied? Select all conditions that apply.

Options :

6406532730706. ✔ $a \neq b$

6406532730707. ✔ $a \neq 0$

6406532730708. ✖ $a = b$

6406532730709. ✖ $a = b = 0$

6406532730710. ✖ $a = 0$

Sub-Section Number :	5
Sub-Section Id :	640653118656
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 74 Question Id : 640653815017 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

Choose the correct option(s) from the following:

Options :

6406532730735. ✔ The orthonormal set obtained from $\{(0,1),(-1,3)\}$ using Gram-Schmidt process is $\{(0,1),(-1,0)\}$.

6406532730736. ✖ $\begin{bmatrix} 1 & -2 \\ 2 & 1 \end{bmatrix}$ is an orthogonal matrix.

6406532730737. ✔ Let $W = \{(x,y,z) \in \mathbb{R}^3 : x+2y+z=0\}$. If $u=(1,-1,1)$ and if P_W is the projection from $\mathbb{R}^3$ to W, then $P_W(u) = u$.

6406532730738. ✖ The determinant of a matrix formed by 3 orthonormal vectors in $\mathbb{R}^3$ is always 1.

Question Number : 75 Question Id : 640653815021 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

Choose the option(s) for which the limit exists.

Options :

6406532730741. ✖ $\lim\limits_{(x,y)\to(0,0)} \dfrac{3x^2y}{x^4+y^2}$

6406532730742. ✖ $\lim\limits_{(x,y)\to(0,0)} \dfrac{|xy|}{x^2+y^2}$.

6406532730743.

$\lim_{(x,y)\to(\pi,1)} \frac{x}{y} - \sin xy.$

6406532730744. $\lim_{(x,y)\to(1,1)} \frac{5x^2 - 6xy + y^2}{x^2 - y^2}$

Sub-Section Number :	6
Sub-Section Id :	640653118657
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Id : 640653814998 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 : (76 to 77)

Question Label : Comprehension

Let $x = \begin{bmatrix} x_1 \\ \vdots \\ x_n \end{bmatrix}$ and $y = \begin{bmatrix} y_1 \\ \vdots \\ y_n \end{bmatrix}$ be two non-zero column vectors in $\mathbb{R}^n$.

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 76 Question Id : 640653814999 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

What is the dimension of xy^T?

Options :

6406532730697.

✔ $n \times n$

6406532730698. ✖ $1 \times n$

6406532730699. ✖ $n \times 1$

6406532730700. ✖ 1×1

Question Number : 77 Question Id : 640653815000 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 rank of xy^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 :	7
Sub-Section Id :	640653118658
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Id : 640653815003 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 : (78 to 80)

Question Label : Comprehension

Let *A* be a 3 × 5 matrix.

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 78 Question Id : 640653815004 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

How many solutions does $Ax = 0$ have?

Options :

6406532730711. ✖ Exactly one solution

6406532730712. ✔ Infinitely many solutions

6406532730713. ✖ No solution

6406532730714. ✖ Insufficient data. This depends on the entries of *A*.

Question Number : 79 Question Id : 640653815005 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

How many solutions does $A^T x = 0$ have?

Options :

6406532730715. ✖ Exactly one solution

6406532730716. ✖ Infinitely many solutions

6406532730717. ✖ No solution

6406532730718. ✔ Insufficient data. This depends on the entries of *A*.

Question Number : 80 Question Id : 640653815006 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

Let $T : \mathbb{R}^5 \to \mathbb{R}^3$ be the linear transformation whose matrix representation is A with respect to the standard basis for both domain and co-domain.

Which of the following is true?

Options :

6406532730719. ✔ *T* could be onto, but it can never be one-one

6406532730720. ✖ *T* could be one-one, but it can never be onto

6406532730721. ✖ *T* could be both one-one and onto

Question Id : 640653815007 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 : (81 to 83)

Question Label : Comprehension

Find the dimension of the given vector spaces in the subquestions.

Sub questions

Question Number : 81 Question Id : 640653815008 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

$U = \{x \in \mathbb{R}^4 | \langle x, u \rangle = 0$ where $u = (1, -1, 2, -1)\}$ is a subspace of $\mathbb{R}^4$ and the dot product is used as the inner product.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

3

Question Number : 82 Question Id : 640653815009 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

$$V = \left\{ \begin{bmatrix} x & 0 & y \\ 0 & 0 & 0 \\ 0 & x+y & 0 \end{bmatrix} : x, y \in \mathbb{R} \right\},$$

where V is a subspace of $M_{3\times3}(\mathbb{R})$, the vector space of all 3×3 real matrices.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

2

Question Number : 83 Question Id : 640653815010 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

$W = \{(x, y, z) : x + y - 2z = 0$
and $2x - y + z = 0$ and $x, y, z \in \mathbb{R}\}$,
where W is a subspace of $\mathbb{R}^3$.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Sub-Section Number :	8
Sub-Section Id :	640653118659
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Id : 640653815011 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 : (84 to 85)

Question Label : Comprehension

Let $T : \mathbb{R}^2 \to \mathbb{R}^2$ be the linear transformation given by
$T(x) = x$ for all $x \in \mathbb{R}^2$.

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 84 Question Id : 640653815012 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

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

Options :

6406532730725. ✔ $\begin{bmatrix} 1 & -1 \\ 1 & 1 \end{bmatrix}$

6406532730726. ✖ $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

6406532730727. ✖ $\begin{bmatrix} 0.5 & 0.5 \\ -0.5 & 0.5 \end{bmatrix}$

6406532730728. ✖ $\begin{bmatrix} 1 & 1 \\ -1 & 1 \end{bmatrix}$

Question Number : 85 Question Id : 640653815013 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following are valid matrix representations of T with suitable bases for the domain and co-domain? Note that the bases could be different for the domain and co-domain.

Options :

6406532730729. ✔ $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$

6406532730730.

✖ $\begin{bmatrix} 6 & 3 \\ 4 & 2 \end{bmatrix}$

6406532730731. ✔ $\begin{bmatrix} -1 & 4 \\ 3 & 0 \end{bmatrix}$

6406532730732. ✖ $\begin{bmatrix} -2 & 1 \\ 2 & -1 \end{bmatrix}$

Question Id : 640653815014 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 : (86 to 87)

Question Label : Comprehension

If (a, b) is the point on the line $y = -x$ nearest to the point $(2, -4)$,

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 86 Question Id : 640653815015 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

find a.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

3

Question Number : 87 Question Id : 640653815016 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

find *b*.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

-3

Question Id : 640653815018 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 : (88 to 89)

Question Label : Comprehension

Answer the given subquestions:

Sub questions

Question Number : 88 Question Id : 640653815019 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

Suppose the function $T(x, y, z) = \dfrac{xz}{x^2 + y^2}$ represents temperature at the point (x, y, z) in a room and (u_1, u_2, u_3) is the unit vector in the direction in which the temperature increases most rapidly at the point $(1, 0, 1)$.
Find $u_1 + u_2 + u_3$.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

0

Question Number : 89 Question Id : 640653815020 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

Suppose a is the rate of change of the function $f(x, y, z) = x^3yz^2$ at the point $(-1, 2, 1)$ in the direction where f decreases most rapidly. Find a^2.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

53

Question Id : 640653815023 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 : (90 to 92)

Question Label : Comprehension

Let $f(x, y) = x^3 + y^3 - 3(x + y^2)$.

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 90 Question Id : 640653815024 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

How many critical points are there for *f*?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

4

Question Number : 91 Question Id : 640653815025 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

How many saddle points are there for *f*?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

2

Question Number : 92 Question Id : 640653815026 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 2 Max. Selectable Options : 0

Question Label : Multiple Select Question

Choose the correct option(s) from the following:

Options :

6406532730751. ✔ f has a local minimum at the point (1,2).

6406532730752. ✖ f has a local maximum at the point (1,2).

6406532730753. ✖ f has a local maximum at the point (1, 0).

6406532730754. ✔ f has a local maximum at the point (-1, 0).

Sub-Section Number :	9
Sub-Section Id :	640653118660
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Id : 640653815027 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 : (93 to 95)

Question Label : Comprehension

Answer the given subquestions about the functions

$u(x,y) = xy + 2e^x$ and $v(x,y) = y^2 + ye^x$

Sub questions

Question Number : 93 Question Id : 640653815028 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 $L_u(x,y)$ is the linear approximation of the function $u(x,y)$ at point $(1,2)$ and $L_u(2,3) = a + be$, and if $L_v(x,y)$ is the linear approximation of the function $v(x,y)$ at point $(2,1)$ and $L_v(2,3) = c + de^2$, where a, b, c, d are integers,

find $a + b$.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

9

Question Number : 94 Question Id : 640653815029 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 $L_u(x, y)$ is the linear approximation of the function $u(x, y)$ at point $(1, 2)$ and $L_u(2, 3) = a + be$, and if $L_v(x, y)$ is the linear approximation of the function $v(x, y)$ at point $(2, 1)$ and $L_v(2, 3) = c + de^2$, where a, b, c, d are integers,

find $c + d$.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

8

Question Number : 95 Question Id : 640653815030 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

Choose the correct option(s) from the following:

Options :

6406532730757. ✔ $z = 2y + (3 + 2e^2)x - 2e^2 - 6$ is the tangent plane to the function $u(x, y)$ at the point $(2, 3)$.

6406532730758. ✔ $x(t) = 2 + \frac{t}{\sqrt{2}}, y(t) = 3 + \frac{t}{\sqrt{2}}, z(t) = (6 + 2e^2) + \frac{t}{\sqrt{2}}(5 + 2e^2)$ is the tangent line of the function $u(x, y)$ at the point $(2, 3)$ in the direction of $(1, 1)$.

6406532730759. ✔

$z = 3e^2x + (6 + e^2)y - 6e^2 - 9$ is the tangent plane to the function $v(x, y)$ at the point $(2, 3)$.

6406532730760. ✖ $x(t) = 2 + \frac{t}{\sqrt{2}}, y(t) = 3 + \frac{t}{\sqrt{2}}, z(t) = (9 + 3e^2) + \frac{t}{\sqrt{2}}(3 + 2e^2)$ is the tangent line of the function $v(x, y)$ at the point $(2, 3)$ in the direction of $(1, 1)$.

Sem2 Statistics2

Section Id :	64065356655
Section Number :	5
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
Section Negative Marks :	0
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 :	640653118661
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Number : 96 Question Id : 640653815031 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction