Notations :

1.Options shown in green color and with ✔ icon are correct.

2.Options shown in red color and with ✖ icon are incorrect.

Change Font Color :	No
Change Background Color :	No
Change Theme :	No
Help Button :	No
Show Reports :	No
Show Progress Bar :	No

Maths1

Section Id :	640653142687
Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	13
Number of Questions to be attempted :	13
Section Marks :	50
Display Number Panel :	Yes
Section Negative Marks :	0
Group All Questions :	No
Section Maximum Duration :	0
Section Minimum Duration :	0
Section Time In :	Minutes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	640653401924
Question Shuffling Allowed :	No

Question Number : 1 Question Id : 6406532180785 Question Type : MCQ

Correct Marks : 0

Question Label : Multiple Choice Question

THIS IS QUESTION PAPER FOR THE SUBJECT "FOUNDATION LEVEL : MATHEMATICS FOR DATA

SCIENCE I (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 :

6406537087643. ✔ Yes

6406537087644. ✖ No

Sub-Section Number : 2

Sub-Section Id : 640653401925

Question Shuffling Allowed : Yes

Question Number : 2 Question Id : 6406532180786 Question Type : MCQ

Correct Marks : 4

Question Label : Multiple Choice Question

Which of the following statements is true about the function $f(x) = -e^{(\ln x)^2}$?

Options :

6406537087645. ✖ f is one-one on its domain.

6406537087646. ✖ f does not have an inverse on $(0, 1]$.

6406537087647. ✖ f is decreasing on $(0, 1)$.

6406537087648. ✔ $f(x) = f\left(\frac{1}{x}\right)$ for all $x > 0$.

Sub-Section Number : 3

Sub-Section Id : 640653401926

Question Shuffling Allowed : Yes

Question Number : 3 Question Id : 6406532180787 Question Type : MSQ

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

Let

$$f(x) = x^2 \quad \text{and} \quad g(x) = \sqrt{x+1}.$$

Match each composition in the first column with its corresponding function and its corresponding domain using the table below.

Composition of Functions	Function	Domain
i) $f \circ g$	a) $x+1$	1) $[-1, \infty)$
ii) $g \circ f$	b) $\sqrt{x^2+1}$	2) $\mathbb{R}$
iii) $f \circ f$	c) x^4	3) $[0, \infty)$
iv) $g \circ g$	d) $\sqrt{\sqrt{x+1}+1}$	4) $[1, \infty)$

Which of the following statements are correct?

Options :

6406537087649. ✔ i) – a) – 1)

6406537087650. ✔ ii) – b) – 2)

6406537087651. ✖ iii) – c) – 3)

6406537087652. ✔ iv) – d) – 1)

Question Number : 4 Question Id : 6406532180795 Question Type : MSQ
Correct Marks : 4 Max. Selectable Options : 0
Question Label : Multiple Select Question

Let

$$f(x) = \begin{cases} x^2 \sin\left(\frac{1}{x}\right), & x \neq 0, \\ 0, & x = 0. \end{cases}$$

Which of the following statements are correct?

Options :

6406537087660. ✔ f is continuous at $x = 0$.

6406537087661. ✔ f' exists at $x = 0$.

6406537087662. ✖ f' is continuous at $x = 0$.

6406537087663. ✔ f' is bounded in a neighbourhood of $x = 0$.

Sub-Section Number : 4
Sub-Section Id : 640653401927
Question Shuffling Allowed : Yes

Question Number : 5 Question Id : 6406532180788 Question Type : SA Keyboard Layout : Inscript
Correct Marks : 5
Question Label : Short Answer Question

Consider the functions

$$f(x) = \log_2(\log_3 x) \quad \text{and} \quad g(x) = -2x^2 + 12x + 63.$$

Let

$$h(x) = (f \circ g)(x).$$

Find the maximum value of $h(x)$.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText
Possible Answers :
2

Sub-Section Number : 5
Sub-Section Id : 640653401928
Question Shuffling Allowed : Yes

Question Number : 6 Question Id : 6406532180789 Question Type : SA Keyboard Layout : Inscript
Correct Marks : 3
Question Label : Short Answer Question

Find the number of real solutions of the equation

$$e^{2x} - 5e^x + 6 = 0.$$

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText

Possible Answers :

2

Question Number : 7 Question Id : 6406532180793 Question Type : SA Keyboard Layout : Inscript

Correct Marks : 3

Question Label : Short Answer Question

Let f be a differentiable function at $x = -2$. The tangent line to the graph of f at the point $(-2, 5)$ passes through the point $(1, -4)$. Find the value of $f'(-2)$.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

-3

Sub-Section Number :	6
Sub-Section Id :	640653401929
Question Shuffling Allowed :	Yes

Question Number : 8 Question Id : 6406532180790 Question Type : SA Keyboard Layout : Inscript

Correct Marks : 4

Question Label : Short Answer Question

If $(a, b) \subset \mathbb{R}$ denotes the largest interval which can be the domain of the function

$$f(x) = \log_3\big(4 - \log_3(x^2 - 4x + 5)\big),$$

then find the value of $a + b$.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

4

Question Number : 9 Question Id : 6406532180791 Question Type : SA Keyboard Layout : Inscript

Correct Marks : 4

Question Label : Short Answer Question

Let $\{a_n\}$ be a sequence such that $a_n \to 0$ as $n \to \infty$. If

$$\lim_{n\to\infty} \frac{\sqrt{1+2a_n} - \sqrt{1-3ka_n}}{a_n} = 4,$$

find k.

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 : 6406532180792 Question Type : SA Keyboard Layout : Inscript
Correct Marks : 4
Question Label : Short Answer Question

Let $\{a_n\}$ be a sequence such that $a_n \to \infty$ as $n \to \infty$. Find the value of

$$\lim_{n\to\infty} a_n^3 \left(\sin\frac{5}{a_n} - \frac{5}{a_n}\cos\frac{2}{a_n}\right).$$

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
-11 to -10.7

Question Number : 11 Question Id : 6406532180794 Question Type : SA Keyboard Layout : Inscript
Correct Marks : 4
Question Label : Short Answer Question

Let $f(2) = 10$ and $f'(2) = 4$. Then, calculate the value of

$$\lim_{x\to 2} \frac{xf(2) - 2f(x)}{x-2}$$

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText

Possible Answers :

2

Question Number : 12 Question Id : 6406532180796 Question Type : SA Keyboard Layout : Inscript

Correct Marks : 4

Question Label : Short Answer Question

Let

$$f(x) = \begin{cases} \dfrac{\sin(kx)}{x}, & x < 0, \\ \sqrt{1+x}+1, & x \geq 0. \end{cases}$$

If f is continuous at $x = 0$, find the value of k.

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 :	640653401930
Question Shuffling Allowed :	No

Question Id : 6406532180797 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix

Question Numbers : (13 to 14)

Question Label : Comprehension

Consider the functions

$$f(x) = \log_3 x$$

and

$$g(x) = x^2 + 8.$$

Let

$$h(x) = (f \circ g)(x).$$

Use this information to answer the given subquestions.

Sub questions

Question Number : 13 Question Id : 6406532180798 Question Type : MSQ

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following statements is (are) correct?

Options :

6406537087665. ✔ The function $h(x)$ is strictly increasing on $(0, \infty)$.

6406537087666. ✔ $h(x) = \log_3(x^2 + 8)$.

6406537087667. ✔ The domain of h is $\mathbb{R}$.

6406537087668. ✖ $h(1) = 1$.

Question Number : 14 Question Id : 6406532180799 Question Type : SA Keyboard Layout : Inscript

Correct Marks : 3

Question Label : Short Answer Question

Find the positive value of x for which $h(x) = 2$.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1