

**Options :**

6406532306372. ✓ Y.Word = "perseverance"

6406532306373. ✖ Y.Word = "determination"

6406532306374. ✓ Y.Word = "diligence"

6406532306375. ✖ Y.Word = "online"

## Maths1

Section Id :	64065348500
Section Number :	2
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
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 :	640653100790
Question Shuffling Allowed :	No
Is Section Default? :	null

**Question Number : 17 Question Id : 640653689409 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 : 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 :**

6406532306376. ✓ YES

6406532306377. ✖ NO

**Question Number : 18 Question Id : 640653689410 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

### Instructions:

- There are some questions which have functions with discrete valued domains (such as day, month, year etc). For simplicity, we treat them as continuous functions.
- For NAT type question, enter only one right answer even if you get multiple answers for that particular question.

**Options :**

6406532306378. ✓ Useful Data has been mentioned above.

6406532306379. ✖ This data attachment is just for a reference & not for an evaluation.

**Sub-Section Number :** 2  
**Sub-Section Id :** 640653100791  
**Question Shuffling Allowed :** No  
**Is Section Default? :** null

**Question Id : 640653689411 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 : (19 to 20)**

Question Label : Comprehension

Consider two functions  $f(x) = \log_2(\log_2(\log_3 x))$  and  $g(x) = -x^2 + 4x + 77$ .

Let  $h(x)$  be a function defined as  $h(x) := (f \circ g)(x)$  in its domain,

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 19 Question Id : 640653689412 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 the maximum value of  $g(x)$ .

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

81

**Question Number : 20 Question Id : 640653689413 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 3**

Question Label : Short Answer Question

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 :**

1

**Question Id : 640653689422 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 : (21 to 22)**

Question Label : Comprehension

Answer the given subquestions.

**Sub questions**

**Question Number : 21 Question Id : 640653689423 Question Type : SA Calculator : None**

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

**Correct Marks : 3**

Question Label : Short Answer Question

Find the following limit.

Let  $f(2) = 10$  and  $f'(2) = 4$ .

Then, calculate the value of

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

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

2

**Question Number :** 22 **Question Id :** 640653689424 **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 the following limit.

Calculate,  $\lim_{x \rightarrow 9} \frac{2(\sqrt{f(x)} - 3)}{\sqrt{x} - 3},$

given that  $f(9) = 9$  and

$f'(9) = 4$

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

8

**Sub-Section Number :** 3

**Sub-Section Id :** 640653100792

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number :** 23 **Question Id :** 640653689414 **Question Type :** MCQ **Is Question**

**Mandatory :** No **Calculator :** None **Response Time :** N.A **Think Time :** N.A **Minimum Instruction**

Time : 0

Correct Marks : 4

Question Label : Multiple Choice Question

Choose the correct option for  $f(x) = \frac{1}{x-1}$ .

Options :

6406532306382. ✖ The function  $(f \circ f)(x)$  in its domain is discontinuous only at the point/points  $x = 1$ .

6406532306383. ✔ The function  $(f \circ f)(x)$  in its domain is discontinuous only at the point/points  $x = 1$  and  $x = 2$ .

6406532306384. ✖ The function  $(f \circ f)(x)$  in its domain is discontinuous only at point/points  $x = 2$ .

6406532306385. ✖ The function  $(f \circ f)(x)$  in its domain is discontinuous only at point/points  $x = 1, x = 2$  and  $x = 3$ .

Question Number : 24 Question Id : 640653689415 Question Type : MCQ Is Question

Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction

Time : 0

Correct Marks : 4

Question Label : Multiple Choice Question

Choose the set of **INCORRECT** options.

Options :

6406532306386. ✔ If a function is continuous at a particular point, then the function is differentiable at that point.

6406532306387. ✖ If a function is differentiable at a particular point, then the function must be continuous at that point.

6406532306388. ✖ If  $f(x)$  and  $g(x)$  are bijective functions, then  $gof(x)$  is also a bijective function.

6406532306389. ✖ If  $f(x)$  and  $g(x)$  are one-one functions, then  $gof(x)$  is also one-one function.

**Sub-Section Number :** 4  
**Sub-Section Id :** 640653100793  
**Question Shuffling Allowed :** No  
**Is Section Default? :** null

**Question Id : 640653689416 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 : (25 to 26)**

Question Label : Comprehension

Answer the given subquestions.

**Sub questions**

**Question Number : 25 Question Id : 640653689417 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 4**

Question Label : Short Answer Question

Find the number of solutions of the equation  $e^{3x} - 4e^{2x} + 3e^x = 0$ .

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

2

**Question Number : 26 Question Id : 640653689418 Question Type : SA Calculator : None**  
**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 3**

Question Label : Short Answer Question

Find the value of  $x$  that satisfies the equation  $9^x - 2 \times 3^{x+1} - 27 = 0$ .

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

2

<b>Sub-Section Number :</b>	5
<b>Sub-Section Id :</b>	640653100794
<b>Question Shuffling Allowed :</b>	No
<b>Is Section Default? :</b>	null

**Question Id : 640653689419 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 : (27 to 28)**

Question Label : Comprehension

Answer the given subquestions.

**Sub questions**

**Question Number : 27 Question Id : 640653689420 Question Type : SA Calculator : None**  
**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 3**



Question Label : Short Answer Question

Find the limit of the following sequence.

$$\{a_n\} \text{ such that } a_n = \frac{n^3 + 2n^2 - 1}{n^3 + 3n + 1}$$

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

1

**Question Number :** 28 **Question Id :** 640653689421 **Question Type :** SA **Calculator :** None

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

**Correct Marks :** 3

Question Label : Short Answer Question

Find the limit of the following sequence.

$$\{a_n\} \text{ such that } a_n = \frac{n^3 + 2^n}{3^n + n^2}$$

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

0

**Sub-Section Number :**

6

**Sub-Section Id :**

640653100795

**Question Shuffling Allowed :**

Yes

Is Section Default? :

null

Question Number : 29 Question Id : 640653689425 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

Given a function

$$f(x) = \begin{cases} \frac{|x|}{x} & \text{if } x \neq 0 \\ 1 & \text{if } x = 0 \end{cases}$$

Which of the following options is/are true?

Options :

6406532306396. ✓  $\lim_{x \rightarrow 0^+} f(x) = f(0).$

6406532306397. ✗  $\lim_{x \rightarrow 0^-} f(x)$  does not exist.

6406532306398. ✓  $f$  is not continuous at  $x = 0$ .

6406532306399. ✗  $f$  is differentiable at  $x = 0$ .

Question Number : 30 Question Id : 640653689429 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

Consider the functions  $f(x) = \sqrt{x+2}$  and  $g(x) = \log(1+x^2)$ . Which of the following options is/are true?

Options :

6406532306409. ✗  $(f \circ g)(x) = \log(2x+1).$

6406532306410. ✖ The domain of the function  $(g \circ f)(x)$  is  $[-2, -1]$

6406532306411. ✔  $(g \circ f)(x) = \log(x + 3)$ .

6406532306412. ✔ The domain of the function  $(g \circ f)(x)$  is  $(-2, \infty)$

Sub-Section Number :	7
Sub-Section Id :	640653100796
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 31 Question Id : 640653689426 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 graphs given below:

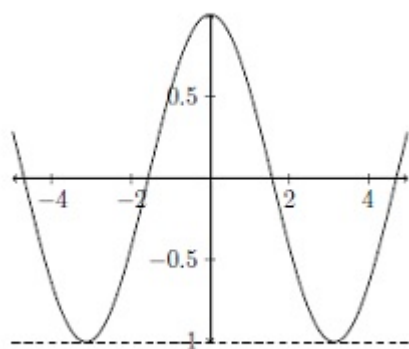


Figure: Curve 1

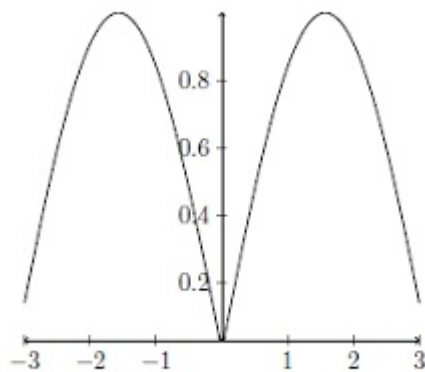


Figure: Curve 2

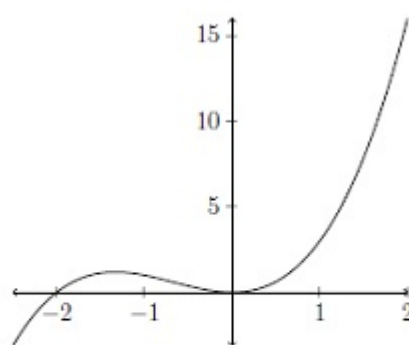


Figure: Curve 3

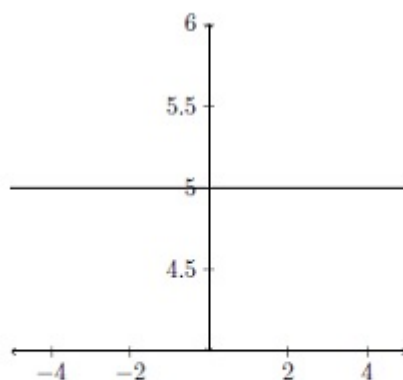


Figure: Curve 4

Choose the set of correct options:

**Options :**

6406532306400. ✓ There are at least two points on Curve 1, where the derivatives of the function corresponding to Curve 1, are equal.

6406532306401. ✓ At the origin the derivative of the function corresponding to Curve 2 does not exist.

6406532306402. ✗ The derivative of the function corresponding to Curve 3, at the origin and at the point  $(-2, 0)$  are the same.

6406532306403. ✗ The derivative of the function corresponding to Curve 4 does not exist at any point.

**Sub-Section Number :**

8

**Sub-Section Id :**

640653100797

**Question Shuffling Allowed :**

Yes

**Is Section Default? :**

null

**Question Number : 32 Question Id : 640653689427 Question Type : SA Calculator : None**

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

**Correct Marks : 5**

Question Label : Short Answer Question

Consider a function  $f$  defined as,

$$f(x) = \begin{cases} 3mx + n & x < 1, \\ 11 & x = 1, \\ 5mx - 2n & x > 1 \end{cases}$$

If  $f$  is continuous at  $x = 1$ , then the value of  $m + n$  is

**Response Type : Numeric**

**Evaluation Required For SA : Yes**

**Show Word Count : Yes**

**Answers Type : Equal**

**Text Areas : PlainText**

**Possible Answers :**

5

**Sub-Section Number :** 9

**Sub-Section Id :** 640653100798

**Question Shuffling Allowed :** Yes

**Is Section Default? :** null

**Question Number : 33 Question Id : 640653689428 Question Type : MCQ Is Question**

**Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Let  $f$  be a differentiable function such that  $f(4) = 6$  and  $f'(4) = -2$ . What is the approximated value of  $f(4.2)$  using the linear approximation of  $f$  at  $x = 4$ ?

**Options :**

6406532306405. ✖ 5.3

6406532306406. ✖ 5.4

6406532306407. ✖ 5.5

6406532306408. ✔ 5.6

Statistics1

Section Id :	64065348501
Section Number :	3
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	10
Number of Questions to be attempted :	10
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 :	640653100799
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Number : 34 Question Id : 640653689430 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0  
Correct Marks : 0