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 :	640653140967
Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	14
Number of Questions to be attempted :	14
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 :	640653396066
Question Shuffling Allowed :	No

Question Number : 1 Question Id : 6406532158254 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 :

6406537020975. ✔ Yes

6406537020976. ✖ No

Sub-Section Number : 2

Sub-Section Id : 640653396067

Question Shuffling Allowed : Yes

Question Number : 2 Question Id : 6406532158255 Question Type : SA Keyboard Layout : Inscript

Correct Marks : 3

Question Label : Short Answer Question

The zeros of the polynomial

$$p(x) = (x-2)(3x+1)q(x)$$

are $2, -\frac{1}{3}, 4, -2$, each with multiplicity 1. If the leading coefficient of $q(x)$ is 1, find $q(1)$.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

-9

Sub-Section Number : 3

Sub-Section Id : 640653396068

Question Shuffling Allowed : Yes

Question Number : 3 Question Id : 6406532158256 Question Type : MCQ

Correct Marks : 2

Question Label : Multiple Choice Question

Consider the polynomial

$p(x) = -2(x+3)^5(x-1)^4(x+2)^3.$

Which of the following best describes the end behavior of $p(x)$?

Options :

6406537020978. ✖ $p(x) \to \infty$ as $x \to \infty$ and $p(x) \to \infty$ as $x \to -\infty$

6406537020979. ✔ $p(x) \to -\infty$ as $x \to \infty$ and $p(x) \to -\infty$ as $x \to -\infty$

6406537020980. ✖ $p(x) \to \infty$ as $x \to \infty$ and $p(x) \to -\infty$ as $x \to -\infty$

6406537020981. ✖ $p(x) \to -\infty$ as $x \to \infty$ and $p(x) \to \infty$ as $x \to -\infty$

Sub-Section Number : 4
Sub-Section Id : 640653396069
Question Shuffling Allowed : Yes

Question Number : 4 Question Id : 6406532158257 Question Type : MSQ
Correct Marks : 4 Max. Selectable Options : 0
Question Label : Multiple Select Question
Which of the following statements is (are) correct?
Options :

6406537020982. ✔ $y + 3 = 5(x - 2)^2$ represents a parabola whose vertex is $(2, -3)$

6406537020983. ✔ $p(x) = ax^5 + bx^3 + 7x - 1$, where a=0 and $b \neq 0$, then $p(x)$ is a polynomial of degree 3

6406537020984. ✔ The lines $4x - 8y + 12 = 0$ and $x - 2y + 3 = 0$ are coincident.

6406537020985. ✖ The lines $2x + y - 1 = 0$ and $2x - y + 4 = 0$ are perpendicular to each other.

Question Number : 5 Question Id : 6406532158259 Question Type : MSQ
Correct Marks : 4 Max. Selectable Options : 0
Question Label : Multiple Select Question

Let

$$p(x) = x^2 - (k+2)x + 2k.$$

Choose the correct statement(s).

Options :

6406537020987. ✖ If $k = 1$, then both roots of $p(x) = 0$ are equal.

6406537020988. ✔ If $k = 2$, then both roots of $p(x) = 0$ are integers.

6406537020989. ✔ There exists a value of k for which 0 is a root of $p(x) = 0$.

6406537020990. ✔ If $k = 0$, then the sum of the roots of $p(x) = 0$ is 2

Question Number : 6 Question Id : 6406532158261 Question Type : MSQ
Correct Marks : 4 Max. Selectable Options : 0
Question Label : Multiple Select Question

Consider the following three straight lines:

$$\ell_1 : 2x - y + 4 = 0$$

$$\ell_2 : 4x - 2y - 3 = 0$$

$$\ell_3 : x + 2y - 5 = 0$$

Which of the following options is true?

Options :

6406537020992. ✖ ℓ_1 and ℓ_2 are perpendicular.

6406537020993. ✔ ℓ_1 and ℓ_2 are parallel.

6406537020994. ✖ ℓ_2 and ℓ_3 are parallel.

6406537020995. ✔

ℓ_1 and ℓ_3 are perpendicular.

Question Number : 7 Question Id : 6406532158263 Question Type : MSQ
Correct Marks : 4 Max. Selectable Options : 0
Question Label : Multiple Select Question

Consider the following relations defined on the set of integers:

$$R_1 = \{(x, y) \mid x, y \in \mathbb{Z},\ y = 2x + 3\}$$

$$R_2 = \{(x, y) \mid x, y \in \mathbb{Z},\ x^2 + y^2 = 1\}$$

Choose the correct option(s):

Options :

6406537020997. ✔ R_1 represents an injective function.

6406537020998. ✖ R_2 represents a function.

6406537020999. ✔ $R_1 \cap R_2$ represents a function.

6406537021000. ✔ R_2 represents a relation but not a function.

Sub-Section Number :	5
Sub-Section Id :	640653396070
Question Shuffling Allowed :	Yes

Question Number : 8 Question Id : 6406532158258 Question Type : SA Keyboard Layout : Inscript
Correct Marks : 4
Question Label : Short Answer Question

One root of the quadratic equation

$$x^2 - kx + 16 = 0$$

is four times the other root. If both roots are positive, 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 :
10

Question Number : 9 Question Id : 6406532158260 Question Type : SA Keyboard Layout : Inscript
Correct Marks : 4
Question Label : Short Answer Question

If $x + a$ is one of the factors of

$$p(x) = x^2 + (2a - 3)x + a^2 + 3a - 4,$$

find the value of a.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
0 to 1

Question Number : 10 Question Id : 6406532158262 Question Type : SA Keyboard Layout : Inscript
Correct Marks : 4
Question Label : Short Answer Question

If

$$A = \{1, 2, 3, 4, 5, 6, 7\}, \quad B = \{2, 4, 6, 8, 10\}, \quad C = \{1, 3, 5, 7, 9\},$$

find the cardinality of

$$\big((A \cup B) \cap (A \cup C)\big) - \big(B \cap C\big).$$

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText
Possible Answers :
7

Question Number : 11 Question Id : 6406532158264 Question Type : SA Keyboard Layout : Inscript

Correct Marks : 4

Question Label : Short Answer Question

Consider the points

$$A(0,0), \quad B(x,y), \quad C(12,6), \quad D(4,1).$$

Suppose the point B divides the line segment AC internally in the ratio $k:1$.

If the distance between B and D is 5, find the positive value of k.

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 : 6406532158266 Question Type : SA Keyboard Layout : Inscript

Correct Marks : 4

Question Label : Short Answer Question

The Cartesian product $B \times B$ has 16 elements. Two of the elements of the Cartesian product are $(3,5)$ and $(7,0)$. Find the sum of all the elements of the set B.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

15

Sub-Section Number : 6

Sub-Section Id : 640653396071

Question Shuffling Allowed : Yes

Question Number : 13 Question Id : 6406532158265 Question Type : MCQ

Correct Marks : 4

Question Label : Multiple Choice Question

A quadratic equation has roots α and β. It is given that

$$\alpha + \beta = 7$$

and

$$\alpha^2 + \beta^2 = 29.$$

Which of the following is the quadratic equation?

Options :

6406537021002. ✔ $x^2 - 7x + 10 = 0$

6406537021003. ✖ $x^2 - 7x + 12 = 0$

6406537021004. ✖ $x^2 - 7x + 14 = 0$

6406537021005. ✖ $x^2 - 7x + 20 = 0$

Sub-Section Number :	7
Sub-Section Id :	640653396072
Question Shuffling Allowed :	Yes

Question Number : 14 Question Id : 6406532158267 Question Type : SA Keyboard Layout : Inscript

Correct Marks : 5

Question Label : Short Answer Question

The distance between the parallel lines $3x + 4y + c_1 = 0$ and $3x + 4y + c_2 = 0$ is 4, where $c_2 > c_1 > 0$. If the minimum distance between the point $(2, 3)$ and the line $3x + 4y + c_1 = 0$ is 6, find the value of $c_1 + c_2$.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

44