Question Number : 58 Question Id : 6406531423259 Question Type : MCQ
Correct Marks : 2
Question Label : Multiple Choice Question

What will be the output of visiting the URL

http://localhost:5000/score?marks=88 ?

Options :

6406534758422. ✖ Guest scored 88 and received grade A

6406534758423. ✖ Guest scored 0 and received grade F

6406534758424. ✔ Guest scored 88 and received grade B

6406534758425. ✖ Invalid marks for Guest

Question Number : 59 Question Id : 6406531423260 Question Type : MCQ
Correct Marks : 2
Question Label : Multiple Choice Question

What is the output of visiting the URL

http://localhost:5000/score?name=Anya&marks=59.5 ?

Options :

6406534758426. ✖ Anya scored 59.5 and received grade F

6406534758427. ✔ Invalid marks for Anya

6406534758428. ✖ Anya scored 0 and received grade F

6406534758429. ✖ Anya scored 59 and received grade F

MLF

Section Id :	64065399824
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
Section Negative Marks :	0
Group All Questions :	No
Enable Mark as Answered Mark for Review and Clear Response :	No
Section Maximum Duration :	0

Section Minimum Duration :	0
Section Time In :	Minutes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	640653230203
Question Shuffling Allowed :	No

Question Number : 60 Question Id : 6406531423261 Question Type : MCQ
Correct Marks : 0
Question Label : Multiple Choice Question
THIS IS QUESTION PAPER FOR THE SUBJECT "DIPLOMA LEVEL : MACHINE LEARNING FOUNDATIONS (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 :
6406534758430. ✔ YES
6406534758431. ✖ NO

Sub-Section Number :	2
Sub-Section Id :	640653230204
Question Shuffling Allowed :	Yes

Question Number : 61 Question Id : 6406531423262 Question Type : MCQ
Correct Marks : 3
Question Label : Multiple Choice Question
Let X denote the number of heads in n independent tosses of a p-biased coin (i.e., $\mathbb{P}(\text{Head}) = p$). What do Markov's and Chebyshev's inequalities imply about the probability that X exceeds $2pn$?

Options :
6406534758432. ✔ Markov's inequality gives $\mathbb{P}(X > 2pn) \leq \frac{1}{2}$; Chebyshev's inequality gives $\mathbb{P}(|X - \mathbb{E}[X]| > pn) \leq \frac{1-p}{np}$.

6406534758433. ✖ Markov's inequality gives $\mathbb{P}(X > 2pn) \leq \frac{1}{2}$; Chebyshev's inequality gives $\mathbb{P}(X > 2pn) \leq \frac{p^2}{n(1-p)}$.

6406534758434. ✖ Markov's inequality gives $\mathbb{P}(X > 2pn) \leq \frac{1}{2}$; Chebyshev's inequality gives no bound since the variance is unknown.

6406534758435. ✖ Markov's inequality gives $\mathbb{P}(X > 2pn) \leq \frac{1}{2}$; Chebyshev's inequality gives a bound independent of p and n.

Sub-Section Number : 3
Sub-Section Id : 640653230205
Question Shuffling Allowed : Yes

Question Number : 62 Question Id : 6406531423264 Question Type : MSQ
Correct Marks : 4 Max. Selectable Options : 0
Question Label : Multiple Select Question

Consider three functions

$$f_1(x, y) = x^4 + x^2 - 2xy + y^2$$

$$f_2(x, y) = x^\alpha y^\beta, \text{ where } x, y, \alpha, \beta \geq 0 \text{ and } \alpha + \beta \leq 1$$

and

$$f_3(x) = (x^2 - 3x + 2)(x^2 - 7x + 12)$$

Which of the following functions are convex function?

Options :

6406534758437. ✔ $f_1(x, y)$ is a convex function.

6406534758438. ✖ $f_2(x, y)$ is a convex function.

6406534758439. ✔ $f_3(x)$ is a convex function in the open interval $(2, 3)$.

6406534758440. ✖ None of these

Sub-Section Number : 4
Sub-Section Id : 640653230206
Question Shuffling Allowed : Yes

Question Number : 63 Question Id : 6406531423265 Question Type : MSQ
Correct Marks : 3 Max. Selectable Options : 0
Question Label : Multiple Select Question

Consider the vectors $v_1 = \begin{bmatrix} 3 \\ 1 \\ 1 \\ -2 \end{bmatrix}, v_2 = \begin{bmatrix} 2 \\ -1 \\ -1 \\ 1 \end{bmatrix}$ and $v_3 = \begin{bmatrix} 1 \\ 2 \\ 0 \\ 3 \end{bmatrix}$. Let $S = \text{span}(v_1)$. Which of the following options is/are true?

Options :

6406534758441. ✔

The projection of v_2 on to S is $\frac{2}{15}v_1$.

6406534758442. ✖ The point in S closest to v_2 is $\frac{-2}{15}v_1$.

6406534758443. ✖ v_3 is orthogonal to v_1

6406534758444. ✔ v_3 is not orthogonal to v_2

Sub-Section Number : 5
Sub-Section Id : 640653230207
Question Shuffling Allowed : Yes

Question Number : 64 Question Id : 6406531423266 Question Type : SA
Correct Marks : 4
Question Label : Short Answer Question

A company manufactures x units of oil A and y units of another oil B. The total cost in rupees, C, of producing these two items is approximated by the function $C = 5x^2 + 2xy + 3y^2 + 500$. If the total production for both oil (both types combined) is 39 units, find the quantity of the oil B in the case of minimum production cost.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText
Possible Answers :
24

Question Number : 65 Question Id : 6406531423267 Question Type : SA
Correct Marks : 4
Question Label : Short Answer Question

Four friends, Priya, Rahul, Sonia, and Tara, are randomly assigned to four distinct chairs in a row at a concert.

Let event C be that Sonia and Tara are assigned to chairs that are next to each other (in either order), and let event D be that Priya is assigned to a chair that is not at either end. Find the conditional probability, $P(C \mid D)$. Enter the answer correct to two decimal places.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes

Answers Type : Range
Text Areas : PlainText
Possible Answers :
0.31 to 0.37

Question Number : 66 Question Id : 6406531423268 Question Type : SA
Correct Marks : 4
Question Label : Short Answer Question

The joint probability density function of random variables X and Y is given by:

$$f(x,y) = \begin{cases} 24xy, & \text{for } 0 < x < 1,\ 0 < y < 1,\ \text{and } x + y < 1 \\ 0, & \text{otherwise} \end{cases}$$

Find the variance of Y, i.e., compute $\text{Var}(Y)$. Enter the answer correct to two decimal places.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
0.02 to 0.06

Sub-Section Number :	6
Sub-Section Id :	640653230208
Question Shuffling Allowed :	Yes

Question Number : 67 Question Id : 6406531423263 Question Type : SA
Correct Marks : 3
Question Label : Short Answer Question

Let $X \sim \text{Normal}(3,4)$ and $Y \sim \text{Normal}(-2,5)$ be two independent random variables. Define the new variable

$$U = 4X + Y$$

Find the value of $P(U < 10)$.

Hint: Use the following values of F_Z, the CDF of the standard normal distribution:

- $F_Z(0.89) = 0.8133$
- $F_Z(-0.89) = 0.1867$
- $F_Z(1.38) = 0.9162$
- $F_Z(-1.38) = 0.0838$
- $F_Z(0) = 0.5$

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText
Possible Answers :
0.5

Sub-Section Number :	7
Sub-Section Id :	640653230209
Question Shuffling Allowed :	No

Question Id : 6406531423269 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix
Question Numbers : (68 to 71)
Question Label : Comprehension

Consider a set $S = \{(x, y) \mid -x - 3y \leq -9 \text{ and } -2x - y \leq -6, x, y \geq 0\}$.
Use this information to answer the given subquestions.

Sub questions

Question Number : 68 Question Id : 6406531423270 Question Type : MCQ
Correct Marks : 2
Question Label : Multiple Choice Question
Let *A* = (*x*, *y*) be a point in the set *S* which is closest to the origin. Choose the correct Primal optimization problem from the following.
Options :

6406534758448. ✖ $\text{Minimize: } x^2 - y^2$
$\text{Subject to: } -x - 3y \leq -9, -2x - y \leq -6, x, y \geq 0$

6406534758449. ✔ $\text{Minimize: } x^2 + y^2$
$\text{Subject to: } -x - 3y \leq -9, -2x - y \leq -6, x, y \geq 0$

6406534758450. ✖ $\text{Minimize: } x^2 + y^2$
$\text{Subject to: } -x - 3y \geq -9, -2x - y \geq -6, x, y \geq 0$

6406534758451. ✖ $\text{Minimize: } -x^2 - y^2$
$\text{Subject to: } -x - 3y \leq -9, -2x - y \leq -6, x, y \geq 0$

Question Number : 69 Question Id : 6406531423271 Question Type : MSQ
Correct Marks : 2 Max. Selectable Options : 0
Question Label : Multiple Select Question

Which of the following options is/are true?

Options :

6406534758452. ✗ The Lagrangian function is $L(x,y) = -x^2 - y^2 + u_1(-x - 3y + 9) + u_2(-2x - y + 6), u_1, u_2 \geq 0.$

6406534758453. ✓ The Lagrangian function is $L(x,y) = x^2 + y^2 + u_1(-x - 3y + 9) + u_2(-2x - y + 6)\ u_1, u_2 \geq 0.$

6406534758454. ✓ Stationary conditions are $2x - u_1 - 2u_2 = 0$ and $2y - 3u_1 - u_2 = 0.$

6406534758455. ✗ Stationary conditions are $2x - 2u_1 - u_2 = 0$ and $2y - 3u_1 - u_2 = 0.$

6406534758456. ✗ Stationary conditions are $2x - u_1 - 2u_2 = 0$ and $2y - 3u_1 + u_2 = 0.$

Question Number : 70 Question Id : 6406531423272 Question Type : SA

Correct Marks : 3

Question Label : Short Answer Question

If $A = (x, y)$ is the closest point to the origin, then find the value of $3x - y$.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

7.8

Question Number : 71 Question Id : 6406531423273 Question Type : MSQ

Correct Marks : 2 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following options is/are true ?

Options :

6406534758458. ✓ *S* is a convex set.

6406534758459. ✓ The objective function of the Primal optimization problem from the previous question number no 9 is a convex function.

6406534758460. ✗ The objective function of the Primal optimization problem from the previous question number no 9 is a concave function.

6406534758461. ✗ None of these

Sub-Section Number : 8

Sub-Section Id : 640653230210

Question Shuffling Allowed : No

Question Id : 6406531423274 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix

Question Numbers : (72 to 73)

Question Label : Comprehension

Let $A = \begin{bmatrix} i & 0 & 0 \\ -i & i & 0 \\ 1 & 0 & -i \end{bmatrix}$.

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 72 Question Id : 6406531423275 Question Type : SA

Correct Marks : 3

Question Label : Short Answer Question

Suppose λ_1, λ_2 and λ_3 are the eigenvalues of $2A^2 - 3I$, find $\lambda_1\lambda_2\lambda_3$.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

-125

Question Number : 73 Question Id : 6406531423276 Question Type : MSQ

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following options is /are true?

Options :

6406534758463. ✔ *A* is not a Hermitian matrix.

6406534758464. ✔ *A* is not a unitary matrix.

6406534758465. ✖ *A* is diagonalizable.

6406534758466. ✖ None of these

Java

Section Id : 64065399825

Section Number : 4

Section type : Online