

X



reviewer3@nptel.iitm.ac.in ▼

Courses » Nonlinear Programming

Announcements **Course** Ask a Question Progress Mentor FAQ

Unit 2 - Week-1

Course outline

How to access the portal

Week-1

- Lesson-1
Convex Sets and Functions
- Lesson-2
Properties of Convex Functions-I
- Lesson-3
Properties of Convex Functions-II
- Lesson-4
Properties of Convex Functions- III

- Lesson-5
Convex Programming Problems

- Quiz : Assignment 1

- Solution of Assignment-1

Week-2

Week-3

Week-4

WEEKLY FEEDBACK

Assignment 1

The due date for submitting this assignment has passed. **Due on 2018-09-12, 23:59 IST.**
As per our records you have not submitted this assignment.

1) The value(s) of $\alpha \in \mathbb{R}$, for which the function $f : \mathbb{R}^2 \rightarrow \mathbb{R}$ 1 point
 $f(x_1, x_2) = 2x_1^2 + \alpha x_1 x_2 + 8x_2^2$ is convex, is/are

$(-\infty, -8)$

$[-8, 8]$

$[-10, 10]$

$(8, \infty)$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$[-8, 8]$

2) Consider the following statements : 1 point

[(i)] $\{(x, y) : x + 2y \leq 4\} \cup \{(x, y) : x^2 + y^2 \leq 1\}$

[(ii)] $\{(x, y) : x + 2y \leq 4\} \cap \{(x, y) : x^2 + y^2 \geq 1\}$

[(iii)] $\{(x, y) : x + 2y \geq 4\} \cup \{(x, y) : x^2 + y^2 \geq 4\}$

[(iv)] $\{(x, y) : x + 2y \geq 4\} \cap \{(x, y) : x^2 + y^2 \leq 4\}$

Then, which of the following pair is a convex – set?

(i),(ii)

(ii),(iii)

(i),(iv)

all of the above

No, the answer is incorrect.

© 2014 NPTEL - Privacy & Terms - Honor Code - FAQs -



A project of



NPTEL

National Programme on
Technology Enhanced Learning

In association with



Funded by

$\{(x, y) : x - y \leq 0\}$

$\{(x, y) : x - y \geq 0\}$

$\{(x, y) : x - y = 0\}$

$\{(x, y) : x - y \neq 0\}$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$\{(x, y) : x - y \leq 0\}$

4) Which one of the following is a true statement?

1 point

If f and g are convex – functions, then $f - g$ is also convex

If f and g are convex – functions, then $\min\{-f(x), -g(x)\}$ is concave

A convex function is always differentiable in its domain

Reciprocal of a convex function f such that $f(x) > 0, \forall x$, is always convex

No, the answer is incorrect.

Score: 0

Accepted Answers:

If f and g are convex – functions, then $\min\{-f(x), -g(x)\}$ is concave

5) Let $f : \mathbb{R} \rightarrow \mathbb{R}$ be given by $f(x) = e^{\alpha x}$,

1 point

$\alpha \in \mathbb{R}$. Then the expression $\alpha(x_1 - x_2)e^{\alpha x_2} \forall x_1, x_2 \in \mathbb{R}$ is

$\leq [e^{\alpha x_1} - e^{\alpha x_2}]$

$\geq [e^{\alpha x_1} - e^{\alpha x_2}]$

$\leq [e^{\alpha x_1} + e^{\alpha x_2}]$

$\geq [e^{\alpha x_1} + e^{\alpha x_2}]$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$\leq [e^{\alpha x_1} - e^{\alpha x_2}]$

6) Consider an optimization problem

1 point

$* - x_1^2 + 2x_1x_2 - 4x_2^2 - 6x_1 + 8x_2$

subject to : $x_1^2 + 2x_2^2 ** 6$,

where $*$ denotes max or min and $**$ denotes \leq, \geq or $=$ respectively.

The problem is a convex optimization problem if

$*$ is max and $**$ is \leq

$*$ is min and $**$ is \leq

* is max and ** is \geq * is min and ** is \geq **No, the answer is incorrect.****Score: 0****Accepted Answers:*** is max and ** is \leq 7) The closest distance to the origin on hyperbolic cylinder $x^2 - z^2 = 1$ is **1 point**

2

 $\sqrt{2}$ 

1



0

No, the answer is incorrect.**Score: 0****Accepted Answers:**

1

8) **1 point**The point $(-2, -2)$ for the function $f(x, y) = xy - x^2 - y^2 - 2x - 2y + 4$ is

local maxima



local minima



saddle point



not a critical point

No, the answer is incorrect.**Score: 0****Accepted Answers:**

local maxima

9) **1 point**The largest interval (a, b) of $k \in \mathbb{R}$,for which the point $(0, 0)$ is the critical point of the function $f(x, y) = x^2 + kxy + y^2$  $(-\infty, \infty)$  $[0, 1]$  $[-1, 1]$  $[-1, 0]$ **No, the answer is incorrect.****Score: 0****Accepted Answers:** $(-\infty, \infty)$

10) The value of $\alpha \in \mathbb{R}$ such that the matrix

1 point

$$M = \begin{bmatrix} \alpha & 1 & -1 \\ 1 & 2 & -3 \\ -1 & -3 & 5 \end{bmatrix}$$

is positive definite, is



$\forall \alpha \in \mathbb{R}$



$\alpha > -3$



$\alpha > \frac{1}{2}$



$\alpha > 1$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$\alpha > 1$

Previous Page

End