

Course outline

How does an NPTEL online course work?

Week 0

Week 1

Week 2

Week 3

Week 4

Week 5

Week 6

Week 7

Week 8

 22.1 Maxima and minima in several variables

 22.2 The Hessian and extrema

 22.3 Completing the squares

 22.4 Constrained extrema and lagrange multipliers

 23.1 Curves

 24.1 Rectifiability and arc-length

 Quiz: Week 8: Assignment 8

 Week 8 Feedback Form: Real Analysis II

 Week 8 Lecture notes

Week 9

Week 10

Week 11

Week 12

Download Videos

Week 8: Assignment 8

The due date for submitting this assignment has passed.

Due on 2021-09-22, 23:59 IST.

As per our records you have not submitted this assignment.

 1) Let $K \subset \mathbb{R}^n$ be a compact set and $f : K \rightarrow \mathbb{R}$ be a smooth function. Then

2 points

 f has local maxima and minima at some points of K .

 f has global maxima and minima at some points of K .

 The derivative of f must vanish at the extrema.

 The derivative of f vanishes at those points of extrema that are also interior points of K .

No, the answer is incorrect.
Score: 0

Accepted Answers:
 f has local maxima and minima at some points of K .

 f has global maxima and minima at some points of K .

 The derivative of f vanishes at those points of extrema that are also interior points of K .

 2) For this question, we will consider the function $f(x, y) = x^2 + y^3$, $g(x, y) = x^2 + y^4$ and $h(x, y) = x^2 - y^4$. Which of the following statements are true?

2 points

 The quadratic form obtained using the Hessian of these functions are all x^2

All three functions have a critical point at 0.

 The function f has minima at the 0.

 The function g has a minima at 0.

No, the answer is incorrect.
Score: 0

Accepted Answers:

 The quadratic form obtained using the Hessian of these functions are all x^2

All three functions have a critical point at 0.

 The function g has a minima at 0.

 3) Consider the two parametrised curves given by e^{it} and e^{2it} defined on $[0, 2\pi]$. Which of the following statements are true?

2 points

Both curves are equivalent.

Both curves parametrise the unit circle.

Both curves have the same length.

The second curve has twice the length as the first.

No, the answer is incorrect.
Score: 0

Accepted Answers:

Both curves parametrise the unit circle.

The second curve has twice the length as the first.

 4) Let $f : \mathbb{R}^3 \rightarrow \mathbb{R}$ be given by $x^k + y^k z^k$, where k is a fixed positive integer. Which of the following is a local extrema of f subject to $x + y + z = a$, $a > 0$?

0 points

$$\frac{a^k}{3^{1-k}}$$

$$a^k$$

$$\frac{a}{3}$$

$$0$$

No, the answer is incorrect.
Score: 0

Accepted Answers:

$$\frac{a^k}{3^{1-k}}$$