

Course outline

How does an NPTEL online course work?

Week 1: Real number system and Limits

Week 2: Continuity and Differentiation of functions

Week 3: Plotting graph of functions

● Lecture 11: Local extrema and Rolle's theorem

● Lecture 12: Mean value theorem and Monotone functions

● Lecture 13: Local extremum tests

● Lecture 14: Concavity and points of inflection

● Lecture 15: Asymptotes and plotting graph of functions.

○ Quiz : Assignment 3

● Feedback For Week 3

● Assignment 3 Solution

Week 4: L'Hospital Rule and Integration

Week 5: Integration and its numerical methods

Week 6: Applications of Integration

Week 7: Improper Integrals, Sequences and Series

Week 8: Series and its convergence

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Assignment 3

The due date for submitting this assignment has passed.

Due on 2021-02-10, 23:59 IST.

As per our records you have not submitted this assignment.

1) Let $f, g : [a, b] \rightarrow \mathbb{R}$ be differentiable functions such that $f'(x) = g'(x), \forall x \in [a, b]$. Then which of the following is true: **1 point**

$f(x) = g(x), \forall x \in [a, b]$.

$f(x) = g(x) + c, \forall x \in [a, b]$ for some $c \in \mathbb{R}$.

$f(x) = g(x) + cx, \forall x \in [a, b]$ for some $c \in \mathbb{R}$.

There exists a point $c \in [a, b]$ such that $f(c) = g(c)$.

No, the answer is incorrect.

Score: 0

Accepted Answers:

$f(x) = g(x) + c, \forall x \in [a, b]$ for some $c \in \mathbb{R}$.

2) The function $f(x) = x^5 - 27x^2 + 7ax + 5$ attains its maximum value at the point $x = 1$. The the value of a is **1 point**

0

3

5

7

No, the answer is incorrect.

Score: 0

Accepted Answers:

7

3) If $f, g : [a, b] \rightarrow \mathbb{R}$ are continuous on $[a, b]$ and differentiable on (a, b) with $f(a) = f(b) = 0$, then which of the following is true? **1 point**

(Hint: Apply Rolle's theorem on $f(x)e^{g(x)}$.)

There exists a point $c \in [a, b]$ such that $f(c) + f'(c)g'(c) = 0$.

There exists a point $c \in [a, b]$ such that $f'(c) + f(c)g'(c) = 0$.

There exists a point $c \in [a, b]$ such that $g(c) + f(c)f'(c) = 0$.

There exists a point $c \in [a, b]$ such that $f(c) + f'(c)g(c) = 0$.

No, the answer is incorrect.

Score: 0

Accepted Answers:

There exists a point $c \in [a, b]$ such that $f'(c) + f(c)g'(c) = 0$.

4) A function $f : [0, 1] \rightarrow \mathbb{R}$ is said to be in $Lip[0, 1]$ if there exists $C > 0$ such that $|f(x) - f(y)| \leq C|x - y|, \forall x, y \in [0, 1]$. Which of the following function does not belong to $Lip[0, 1]$? **1 point**

$|x|$.

$\sin x$.

e^x .

\sqrt{x} .

No, the answer is incorrect.

Score: 0

Accepted Answers:

\sqrt{x} .

5) Let $f : \mathbb{R} \rightarrow \mathbb{R}$ be a differentiable function such that $f'(x) = 4e^x(4x^2 - 1)(x^2 - x - 6)$, then f is increasing on **1 point**

$(-\infty, -2) \cup (-\frac{1}{2}, \frac{1}{2}) \cup (3, \infty)$.

$(-2, -\frac{1}{2}) \cup (\frac{1}{2}, 3)$.

$(-2, -\frac{1}{2}) \cup (3, \infty)$.

$(-2, 0) \cup (-\frac{1}{2}, \frac{1}{2}) \cup (3, \infty)$.

No, the answer is incorrect.

Score: 0

Accepted Answers:

$(-\infty, -2) \cup (-\frac{1}{2}, \frac{1}{2}) \cup (3, \infty)$.

6) The absolute maximum value of the function $f(x) = 2x^3 - 9x^2 + 12x - 6$ in $[0, 3]$ is **1 point**

1.

2.

3.

4.

No, the answer is incorrect.

Score: 0

Accepted Answers:

3.

7) The function $f(x) = 5x^7 - 21x^6 + 21x^5 + 10x + 21$ is concave down in which of the following domain: **1 point**

$(0, 1)$.

$(1, 2)$.

$(2, 3)$.

$(0, 2)$.

No, the answer is incorrect.

Score: 0

Accepted Answers:

$(1, 2)$.

8) The point of inflection of the function $e^x \cos x$ in $[-2, 2]$ is **1 point**

-1.

1.

0.

No point of inflection.

No, the answer is incorrect.

Score: 0

Accepted Answers:

0.

9) Let $f(x) = \frac{x^{\frac{3}{2}} - 1}{\sqrt{x^4 + 1}}$. Then which of the following is correct? **0 points**

$x = 1$ is a vertical asymptote.

$x = 0$ is a vertical asymptote.

$x = 1$ is a horizontal asymptote.

$x = 0$ is a horizontal asymptote.

No, the answer is incorrect.

Score: 0

Accepted Answers:

$x = 0$ is a horizontal asymptote.

10) Which of the following is a slant asymptote for the curve $y = \frac{x^3 + 1}{x^2 - 9}, x > 3$? **1 point**

$y = x$.

$y = -x$.

$y = x + 1$.

$y = x - 1$.

No, the answer is incorrect.

Score: 0

Accepted Answers:

$y = x$.