

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

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

 Lecture 36: Comparison tests for Series

 Lecture 37: Ratio and Root test for series

 Lecture 38: Integral test and Leibniz test for series

 Lecture 39: Revision I

 Lecture 40: Revision II

 Quiz : Assignment 8

 Feedback For Week 8

 Assignment 8 Solution

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Assignment 8

The due date for submitting this assignment has passed.

Due on 2021-03-17, 23:59 IST.

As per our records you have not submitted this assignment.

1) Which of the following series converges

1 point

- $\sum_{n=1}^{\infty} \frac{n}{n+1}$
 $\sum_{n=1}^{\infty} \frac{\sin n}{n^2}$
 $\sum_{n=1}^{\infty} \frac{1}{2^n}$
 $\sum_{n=1}^{\infty} \frac{1}{n^n}$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$\sum_{n=1}^{\infty} \frac{\sin n}{n^2}$$

2) Which of the following series converges?

1 point

- $\sum_{n=1}^{\infty} \frac{n+2^n}{n^2 2^n}$
 $\sum_{n=1}^{\infty} \frac{n^2 2^n}{n+2^n}$
 $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n^2+2}}$
 $\sum_{n=1}^{\infty} \frac{1}{\ln n}$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$\sum_{n=1}^{\infty} \frac{n+2^n}{n^2 2^n}$$

 3) Let $a_n = \frac{(3n)!}{n!(n+1)!(n+2)!}$ and $b_n = \frac{4^n n! n!}{(2n)!}$, $\forall n \in \mathbb{N}$. Then which of the following is true?

1 point

- By ratio test, the series $\sum_{n=1}^{\infty} a_n$ converges.
 Ratio test is inconclusive for the series $\sum_{n=1}^{\infty} a_n$.
 By ratio test, the series $\sum_{n=1}^{\infty} b_n$ converges.
 Ratio test is inconclusive for the series $\sum_{n=1}^{\infty} b_n$.

No, the answer is incorrect.

Score: 0

Accepted Answers:

 Ratio test is inconclusive for the series $\sum_{n=1}^{\infty} b_n$.

4) Which of the following series converges?

1 point

- $\sum_{n=1}^{\infty} \frac{(n!)^n}{(n^n)^3}$
 $\sum_{n=1}^{\infty} \frac{n^n}{(2^n)^3}$
 $\sum_{n=1}^{\infty} \frac{(n!)^n}{2^{n^2}}$
 $\sum_{n=1}^{\infty} \frac{(n!)^n}{n^{n^2}}$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$\sum_{n=1}^{\infty} \frac{(n!)^n}{n^{n^2}}$$

5) Which of the following is true?

1 point

- By ratio test, the series $\sum_{n=1}^{\infty} \frac{1}{n^{\frac{1}{2}}}$ converges.
 By root test, the series $\sum_{n=1}^{\infty} \frac{1}{n^{\frac{1}{2}}}$ converges.
 By integral test, the series $\sum_{n=1}^{\infty} \frac{1}{n^{\frac{1}{2}}}$ converges.
 The series $\sum_{n=1}^{\infty} \frac{1}{n^{\frac{1}{2}}}$ diverges.

No, the answer is incorrect.

Score: 0

Accepted Answers:

 By integral test, the series $\sum_{n=1}^{\infty} \frac{1}{n^{\frac{1}{2}}}$ converges.

 6) Which of the following series **diverges** (does not converge)?

1 point

- $\sum_{n=1}^{\infty} \frac{(-1)^n}{n+2}$
 $\sum_{n=1}^{\infty} (-1)^n \frac{n}{n^2+2}$
 $\sum_{n=1}^{\infty} (-1)^n \frac{n^2}{n^2+2}$
 $\sum_{n=1}^{\infty} (-1)^n \frac{n^2}{n^4+2}$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$\sum_{n=1}^{\infty} (-1)^n \frac{n^2}{n^2+2}$$

7) Which of the following series converges?

1 point

- $\sum_{n=1}^{\infty} \frac{1}{n \ln n}$
 $\sum_{n=1}^{\infty} \frac{1}{n(\ln n)^3}$
 $\sum_{n=1}^{\infty} \frac{1}{n \ln n^3}$
 $\sum_{n=1}^{\infty} \frac{1}{(\ln n)^3}$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$\sum_{n=1}^{\infty} \frac{1}{n(\ln n)^3}$$

 8) Let $f(x) = \begin{cases} 0, & x < \frac{1}{2} \\ \frac{x^2}{2}, & \frac{1}{2} \leq x < 1 \\ \frac{1}{2}, & x \geq 1 \end{cases}$. Then which of the following is true?

1 point

- f is continuous at $x = \frac{1}{2}$.
 $\lim_{h \rightarrow 0^+} \frac{f(x+h)-f(x)}{h}$ exists at $x = \frac{1}{2}$.
 $\lim_{h \rightarrow 0^-} \frac{f(x+h)-f(x)}{h}$ exists at $x = \frac{1}{2}$.
 f is differentiable at $x = 1$.

No, the answer is incorrect.

Score: 0

Accepted Answers:

 $\lim_{h \rightarrow 0^+} \frac{f(x+h)-f(x)}{h}$ exists at $x = \frac{1}{2}$.

 9) Let $f(x) = \int_1^{x^2} t^{\frac{3}{2}} e^{\frac{4}{t}} dt$, then the value of $f'(2)$ is

1 point

- $4e$
 $8e$
 $16e$
 $32e$

No, the answer is incorrect.

Score: 0

Accepted Answers:

32e

 10) Let $f(x) = x^{11} + 6x^5 + x - 11$. Then which of the following is true?

1 point

- $f(x) = 0$ has no real roots.
 $f(x) = 0$ has exactly one root in \mathbb{R} .
 $f(x) = 0$ has exactly two roots in \mathbb{R} .
 $f(x) = 0$ has a root in $(2, \infty)$.

No, the answer is incorrect.

Score: 0

Accepted Answers:

 $f(x) = 0$ has exactly one root in \mathbb{R} .