

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

Lecture 31: Improper Integrals

Lecture 32: Sequences

Lecture 33: Algebra of sequences and Sandwich theorem

Lecture 34: Subsequences

Lecture 35: Series

Quiz : Assignment 7

Feedback For Week 7

Assignment 7 Solution

Week 8: Series and its convergence

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Assignment 7

The due date for submitting this assignment has passed.

Due on 2021-03-10, 23:59 IST.

As per our records you have not submitted this assignment.

1) Which of the following improper integral converges?

1 point

$\int_1^{\infty} \frac{dx}{x^{1.001}}$

$\int_1^{\infty} \frac{dx}{x^{0.999+1}}$

$\int_0^1 \frac{dx}{x^{1.001}}$

$\int_1^{\infty} \frac{x^{0.001} dx}{1+x^{0.001}}$

 No, the answer is incorrect.
Score: 0

 Accepted Answers:
 $\int_1^{\infty} \frac{dx}{x^{1.001}}$

 2) Let $I = \int_0^1 \frac{dx}{x - \sin x}$ and $II = -\int_0^1 x \ln x dx$. Then which of the following is true?

1 point

 I converges but II diverges.

 I diverges but II converges.

 I and II both converges.

 I and II both diverges.

 No, the answer is incorrect.
Score: 0

 Accepted Answers:
 I diverges but II converges.

3) Which of the following sequence converges?

1 point

$\frac{3^n}{3n}$

$1 + (-1)^n$

$\frac{1+(-1)^n}{n}$

$3(-1)^n$

 No, the answer is incorrect.
Score: 0

 Accepted Answers:
 $\frac{1+(-1)^n}{n}$

4) Which of the following statement is true?

1 point

 Every bounded sequence is convergent.

 Every sequence has a bounded subsequence.

 If the subsequences $\{x_{2n}\}$ and $\{x_{2n+1}\}$ of the sequence $\{x_n\}$ converge, then the sequence $\{x_n\}$ converges.

 Every subsequence of a convergent sequence is bounded.

 No, the answer is incorrect.
Score: 0

 Accepted Answers:
Every subsequence of a convergent sequence is bounded.

 5) Let $A = \lim_{n \rightarrow \infty} \frac{1}{\sqrt{n^2-n} - \sqrt{n^2+n}}$. Then the value of A is

1 point

0

1

-1

∞

 No, the answer is incorrect.
Score: 0

 Accepted Answers:
-1

 6) Let $x_1 = 1$ and $x_n = \frac{n}{n^2+1} + \frac{n}{n^2+2} + \frac{n}{n^2+3} + \dots + \frac{n}{n^2+n}$, $n \geq 2$, Then which of the following is true?

1 point

$\lim_{n \rightarrow \infty} x_n = 0$.

$\lim_{n \rightarrow \infty} x_n = 1$.

 The sequence $\{x_n\}$ is unbounded.

 The sequence $\{x_n\}$ does not converge.

 No, the answer is incorrect.
Score: 0

 Accepted Answers:
 $\lim_{n \rightarrow \infty} x_n = 1$.

 7) Let $\{x_n\}$ be a sequence of positive real numbers. Then which of the following is true?

1 point

 If $|x_{n+2} - x_{n+1}| < |x_{n+1} - x_n|$, $\forall n \in \mathbb{N}$, then $\{x_n\}$ converges.

 If $\lim_{n \rightarrow \infty} (x_{n+1} - x_n) = 0$, then $\{x_n\}$ converges.

 If $\{x_n\}$ converges, then $\lim_{n \rightarrow \infty} (x_{n+1}^2 - x_n^2) = 0$.

 If $\{x_n\}$ converges, then $\lim_{n \rightarrow \infty} n^2(x_{n+1} - x_n) = 0$.

 No, the answer is incorrect.
Score: 0

 Accepted Answers:
If $\{x_n\}$ converges, then $\lim_{n \rightarrow \infty} (x_{n+1}^2 - x_n^2) = 0$.

 8) Let $A = \lim_{n \rightarrow \infty} \left(\frac{n^2}{n^2+1} \right)^{n^2}$. Then the value of A is

1 point

0

1

e

$\frac{1}{e}$

 No, the answer is incorrect.
Score: 0

 Accepted Answers:
 $\frac{1}{e}$

9) Which of the following series converges?

1 point

$\sum_{n=1}^{\infty} \sin\left(\frac{n\pi}{2}\right)$

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

$\sum_{n=1}^{\infty} \frac{4^n}{2^n+3^n}$

$\sum_{n=1}^{\infty} \frac{2^n+3^n}{4^n}$

 No, the answer is incorrect.
Score: 0

 Accepted Answers:
 $\sum_{n=1}^{\infty} \frac{2^n+3^n}{4^n}$

10) Which of the following series diverges?

1 point

$\sum_{n=1}^{\infty} \frac{1}{(4n-3)(4n+1)}$

$\sum_{n=1}^{\infty} \left(\frac{1}{\sqrt{n}} - \frac{1}{\sqrt{n+1}} \right)$

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

$\sum_{n=1}^{\infty} (\sec(n\pi) - \sec((n+1)\pi))$

 No, the answer is incorrect.
Score: 0

 Accepted Answers:
 $\sum_{n=1}^{\infty} (\sec(n\pi) - \sec((n+1)\pi))$