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*

- $\int_1^\infty \frac{dx}{x^{1.001}}$
- $\int_1^\infty \frac{dx}{x^{0.999+1}}$
- $\int_0^1 \frac{dx}{x^{1.001}}$
- $\int_1^\infty \frac{x^{0.001}}{1+x^{0.001}}\frac{dx}{}$

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 $A = \lim_{n\to\infty} \frac{1}{\sqrt{n^2-n}-\sqrt{n^2+n}}$. 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 $x_n = \frac{n}{n^2+1} + \frac{n}{n^2+2} + \frac{n}{n^2+3} + \cdots + \frac{n}{n^2+n}, n \geq 2$, Then which of the following is true? *1 point*

- $\lim_{n\to\infty} x_n = 0.$
- $\lim_{n\to\infty} x_n = 1.$
- The sequence $\{x_n\}$ is unbounded.
- The sequence $\{x_n\}$ does not converge.

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\lim_{n\to\infty} x_n = 1.$

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

No, the answer is incorrect.
Score: 0
Accepted Answers:
If $\{x_n\}$ converges, then $\lim_{n\to\infty}(x_{n+1}^2 - x_n^2) = 0.$

8) Let $A = \lim_{n\to\infty} \left(\frac{n^2}{n^2+1}\right)^{n^2}$. 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*

- $\sum_{n=1}^{\infty} \sin(\frac{n\pi}{2})$
- $\sum_{n=1}^{\infty} \frac{1}{|\sin n|}$
- $\sum_{n=1}^{\infty} \frac{4^n}{2^n+3^n}$
- $\sum_{n=1}^{\infty} \frac{2^n+3^n}{4^n}$

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