Online Homework System

Assignment Worksheet
7/8/20 - 11:28:49 AM EDT

Name: ______________________________

Class: MATH 118 Spring 2020 Calculus for Engineers II

Class #: ______________________________

Section #: ______________________________

Instructor: Diana Castaneda Santos

Assignment: Mobius Assignment 7

Question 1: (1 point)

Determine the sum of the following series with a precision of ± 0.001: In other words, so that

$$|R_n| \leq 0.001$$

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

Answer: ____________

Question 2: (1 point)

Determine if the following series is absolutely convergent, conditionally convergent, or divergent

$$\sum_{n=1}^{\infty} (-1)^n \frac{n^6}{2^n}$$

(a) Absolutely Convergent

(b) Conditionally Convergent

(c) Divergent

Question 3: (2 points)

Consider the series $\sum_{n=1}^{\infty} \frac{(-2)^{n-1}}{\sqrt{n+1}}$, and let $a_n = \frac{(-2)^{n-1}}{\sqrt{n+1}}$. Evaluate the following limit. (Remember to type *infinity* for ∞)

$$\lim_{n \to \infty} \left| \frac{a_{n+1}}{a_n} \right| = \_\_\_\_\_\_\_\_\_\_$$

Based on the evaluation above, what conclusion can you draw about the series?

(a) The series is convergent.

(b) The series is divergent.

(c) The ratio test is inconclusive in this case.

Question 4: (1 point)

Determine if the following series is absolutely convergent, conditionally convergent, or divergent

$$\sum_{n=1}^{\infty} \frac{(-1)^n}{9n+6}$$

(a) Absolutely Convergent

(b) Conditionally Convergent

(c) Divergent

Question 5: (2 points)

The series

$$\sum_{n=1}^{\infty} \frac{n+7}{\sqrt[5]{n^{11}+n^{5}}}$$

(a) diverges since $\lim_{n \to \infty} a_n \neq 0$

(b) diverges via the integral test

(c) converges via the ratio test

(d) converges via the limit comparison test using $\sum_{n=1}^{\infty} n^{\frac{-6}{5}}$

(e) diverges because it's a p-series with $p < 1$

Question 6: (1 point)

Consider the alternating series $\sum_{n=4}^{\infty} (-1)^n b_n$ with

$$b_n = \frac{9n^3}{\sqrt{6n^6 - 2}}$$

(a) Is the sequence $\{b_n\}$ increasing or decreasing?

(a) Increasing ($b_{n+1} \geq b_n$)

(b) Decreasing ($b_{n+1} \leq b_n$)

(b) Determine the limit of the sequence $\{b_n\}$ as $n \to \infty$.

$\lim_{n \to \infty} b_n =$ ___________

(c) Using the Alternating Series Test, can you conclude that the series is convergent?

(a) Yes, it is convergent.

(b) The Alternating Series Test cannot be applied here.

Question 7: (1 point)

Let

$$s = \sum_{k=2}^{\infty} \frac{1}{k(\ln(k))^2}$$

$$s_n = \sum_{k=2}^{n} \frac{1}{k(\ln(k))^2}$$

Using the integral test, which of the following is the smallest value of n that will make the error $s - s_n$ at most 0.17?

$n =$

- **(a)** 179
- **(b)** 718
- **(c)** 119
- **(d)** 359
- **(e)** 89

Question 8: (1 point)

(a) Evaluate the following integral.

$\int_2^{\infty} \frac{1}{x\ln(x)}\,dx =$ __________

(If needed, remember to type *infinity* for ∞.)

(b) Based on your result to the integral above, what can you determine about the series $\sum_{n=2}^{\infty} \frac{1}{n\ln(n)}$?

- **(a)** The series is convergent.
- **(b)** The series is divergent.
- **(c)** No conclusion can be drawn.
