

Full Name:
Section:

ID:

Question 1 Determine whether the following series are convergent or divergent.
Justify your answer.

$$a) \sum_{n=1}^{\infty} (-1)^n \ln\left(1 + \frac{1}{n}\right), \quad b) \sum_{n=1}^{\infty} \frac{\sin(n)}{n^2 + \cos^2(n)}, \quad c) \sum_{n=1}^{\infty} (-1)^n \left(\frac{n+1}{n}\right)^n, \quad d) \sum_{n=1}^{\infty} \frac{1}{n \sqrt[n]{n}}.$$

solution

Question 2 The error in approximating the sum of the series $\sum_{n=1}^{\infty} \frac{(-1)^n}{\sqrt[n]{n+2}}$ by the sum of the first 29 terms is less than or equal to

- a) $2/5$ b) $1/3$ c) $1/5$ d) $1/2$ e) $1/\sqrt[5]{33}$

Question 3 Discuss the convergence of the series $\sum_{n=2}^{\infty} \left(\frac{\ln(n)}{2}\right)^n \frac{1}{n!}$.

Hint: You may need to use $\lim_{n \rightarrow \infty} \left(1 + \frac{\ln(1+1/n)}{\ln(n)}\right)^n = 1$.

solution