W08 - Homework

Stepwise problems - Thu. 11:59pm

Positive series

01

Integral Test (IT)

Use the Integral Test to determine whether the series converges:

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

Show your work. You must check that the test is applicable.

02

Direct Comparison Test (DCT)

Determine whether the series is convergent by using the Direct Comparison Test.

Show your work. You must check that the test is applicable.

- (a) $\displaystyle\sum_{n=1}^{\infty} \frac{1}{n^{1/3}+2^n}$
- (b) $\displaystyle\sum_{k=2}^{\infty} \frac{\sqrt{k}}{k-1}$

03

Limit Comparison Test (LCT)

Use the Limit Comparison Test to determine whether the series converges:

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

Show your work. You must check that the test is applicable.

Alternating series

04

Absolute and conditional convergence

Apply the Alternating Series Test (AST) to determine whether the series are absolutely convergent, conditionally convergent, or divergent.

Show your work. You must check that the test is applicable.

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

Regular problems - Sat. 11:59pm

Positive series

05

Integral Test (IT)

Determine whether the series is convergent by using the Integral Test.

Show your work. You must check that the test is applicable.

- (a) $\sum_{n=1}^{\infty} \frac{1}{n^{1.1}}$
- (b) $\sum_{n=1}^{\infty} ne^{-n^2}$
- (c) $\sum_{n=1}^{\infty} \frac{1}{\sqrt[3]{n^2}}$

06

Integral Test, Direct Comparison Test, Limit Comparison Test

Determine whether the series converges by checking applicability and then applying the designated convergence test.

- (a) Integral Test: $\sum_{n=2}^{\infty} \frac{\ln n}{n^2}$
- (b) Direct Comparison Test: $\sum_{n=1}^{\infty} \frac{n^3}{n^5+4n+1}$
- (c) Limit Comparison Test: $\sum_{n=2}^{\infty} \frac{n^2}{n^4-1}$

07

Limit Comparison Test (LCT)

Use the Limit Comparison Test to determine whether the series converges:

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

Show your work. You must check that the test is applicable.

Alternating series

08

Absolute and conditional convergence

Determine whether the series are absolutely convergent, conditionally convergent, or divergent by applying the Alternating Series Test (AST).

Show your work. You must check that the test is applicable.

- (a) $\sum_{n=1}^{\infty} \frac{(-1)^n}{1+\frac{1}{n}}$
- (b) $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{(2n+1)!}$
- (c) $\sum_{n=1}^{\infty} \frac{\cos n\pi}{n^3+1}$

09

Alternating series: error estimation

Find the approximate value of $\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{n!}$ such that the error E_n satisfies $|E_n| < 0.005$.

How many terms do you really need?