W10 - Homework

Stepwise problems - Thu. 11:59pm

Ratio test and Root test

01

Ratio and root tests

Apply the ratio test or the root test to determine whether each of the following series is absolutely convergent, conditionally convergent, or divergent.

(a) $\sum_{k=0}^{\infty} \left(\frac{k}{3k+1} \right)^k$

(b) $\sum_{n=1}^{\infty} (-1)^n \frac{e^n}{n!}$

(c) $\sum_{n=1}^{\infty} \frac{1}{(2n)!}$

Power series: Radius and Interval

02

Power series - radius and interval

Find the radius and interval of convergence for these power series:

(a) $\sum_{n=1}^{\infty} \frac{x^n}{n^2 3^n}$

(b) $\sum_{n=1}^{\infty} \frac{x^n}{n 3^n}$

(c) $\sum_{n=1}^{\infty} \frac{x^n}{3^n}$

Regular problems - Sat. 11:59pm

Ratio test and Root test

03

Ratio and root tests

Apply the ratio test or the root test to determine whether each of the following series is absolutely convergent, conditionally convergent, or divergent.

(a) $\sum_{n=1}^{\infty} \frac{(-2)^n}{n^{100}}$

(b) $\sum_{n=0}^{\infty} \left(\frac{5n}{10n+4} \right)^n$

(c) $\sum_{n=1}^{\infty} \frac{\sqrt{n}}{3^n}$

Series tests: strategy tips

04

Various limits, Part 1

Find the limits. You may use $+\infty$ or $-\infty$ or DNE as appropriate. Braces indicate sequences.

- C = Convergent
- AC = Absolutely Convergent
- CC = Conditionally Convergent
- D = Divergent

a_n	$\lim_{n\to\infty} a_n$	$\{a_n\}$ **C or D**	$\lim_{n\to\infty}(-1)^n a_n$	$\{(-1)^n a_n\}$ **C or D**	$\sum a_n$ **AC, CC, or D**	$\sum(-1)^n a_n$ **AC, CC, or D**
$\frac{1}{n+2}$						
$\frac{n}{n+2}$						
$\frac{1}{n^2+2}$						
$\frac{4}{2^n}$						
$\frac{4n}{2^n}$						

05

Various limits, Part II

Find the limits. You may use $+\infty$ or $-\infty$ or DNE as appropriate. Braces indicate sequences.

- C = Convergent
- AC = Absolutely Convergent
- CC = Conditionally Convergent
- D = Divergent

a_n	$\lim_{n\to\infty} a_n$	$\{a_n\}$ **C or D**	$\lim_{n\to\infty}(-1)^n a_n$	$\{(-1)^n a_n\}$ **C or D**	$\sum a_n$ **AC, CC, or D**	$\sum(-1)^n a_n$ **AC, CC, or D**
$\frac{4n!}{2^n}$						
$\frac{(n+2)3^n}{n!}$						

a_n	$\lim_{n\to\infty} a_n$	$\{a_n\}$ **C or D**	$\lim_{n\to\infty}(-1)^n a_n$	$\{(-1)^n a_n\}$ **C or D**	$\sum a_n$ **AC, CC, or D**	$\sum(-1)^n a_n$ **AC, CC, or D**
$\frac{4^n}{(3n)^n}$						
$\frac{1}{(2n+1)!}$						

Power series: Radius and Interval

06

Power series - radius and interval

Find the radius and interval of convergence for these power series:

(a) $\sum_{n=0}^{\infty}(-1)^n\frac{(x+3)^n}{n!}$

(b) $\sum_{n=1}^{\infty}(-1)^n\frac{(x-7)^n}{n}$

(c) $\sum_{n=12}^{\infty}n^n(x-2)^n$

07

Power series - radius and interval

Find the radius and interval of convergence for these power series:

(a) $\sum_{n=0}^{\infty}\frac{(x-8)^n}{n^4+1}$

(b) $\sum_{n=1}^{\infty}\frac{x^n}{3\cdot 7\cdot 11\cdots(4n-1)}$