

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

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

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

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