

# W10 Regular

Due date: Sunday 3/22, 11:59pm

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## 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.

$$(a) \sum_{n=1}^{\infty} \frac{(-2)^n}{n^{100}} \quad (b) \sum_{n=0}^{\infty} \left( \frac{5n}{10n+4} \right)^n \quad (c) \sum_{n=1}^{\infty} \frac{\sqrt{n}}{3^n}$$

✍ **Various limits, Part I**

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

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

**✍ Power series - radius and interval**

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

$$(a) \sum_{n=0}^{\infty} (-1)^n \frac{(x+3)^n}{n!} \quad (b) \sum_{n=1}^{\infty} (-1)^n \frac{(x-7)^n}{n} \quad (c) \sum_{n=12}^{\infty} n^n (x-2)^n$$

**✍ Power series - radius and interval**

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

$$(a) \sum_{n=0}^{\infty} \frac{(x-8)^n}{n^4 + 1} \quad (b) \sum_{n=1}^{\infty} \frac{x^n}{3 \cdot 7 \cdot 11 \cdots (4n-1)}$$