

Convergence Tests

- ① n th term test - good first check for any series
inconclusive when $\lim_{n \rightarrow \infty} a_n = 0$
- ② integral test - good for proving p -series converge/diverge
need to be able to compute integral
- ③ comparison test - good for modifications of p -series
terms need to be positive, sometimes inequalities don't work out
- ④ limit comparison test - good for modifications of p -series
terms need to be positive, inconclusive if $\lim \frac{a_n}{b_n} = 0$
- ⑤ ratio test - good for series involving $x^n, n!$
- inconclusive when $L=1$, fails for p -series
- ⑥ absolute convergence test - good for some alternating p -series
- inconclusive when $\sum |a_n|$ diverges
- should be used first if question asks about absolute vs. conditional convergence.
- ⑦ alternating series test - good when absolute convergence test fails - inconclusive if conditions (a_n decreasing, $a_n \rightarrow 0$) fail.