

Math 102 — Absolute and conditional convergence

Summary. Try each of the following problems together in a small group.

Problem 1. For each of the following series, say whether the series is absolutely convergent, conditionally convergent, or divergent and explain why.

- If you believe the series is absolutely convergent, explain why $\sum |a_n|$ converges (eg. use the ratio test, or compare to a convergent p -series).
- If you believe the series is conditionally convergent explain why $\sum |a_n|$ diverges (eg. compare with a divergent p -series) and explain why $\sum a_n$ converges (eg. use the alternating series test).
- If you believe the series diverges, explain why (eg. use the ratio test or n th term test).

a. $\sum_{n=1}^{\infty} \frac{(-1)^n n^2}{4^n}$

b. $\sum_{n=1}^{\infty} \frac{(-2)^n}{(2n)!}$

c. $\sum_{n=1}^{\infty} \frac{(-1)^n}{n^3 + n^2 + 1}$

d. $\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{n^4 + n^3 + 3}$

e. $\sum_{n=1}^{\infty} \frac{(-1)^n}{n^{1/4} + 1}$

f. $\sum_{n=1}^{\infty} (-1)^n n$