

Problem 1.

Represent the function

$$\frac{z+1}{z-1}$$

(a) as a power series around zero and find its radius of convergence;

(b) as a Laurent series in the domain $\{|z| > 1\}$.

Problem 2.

Write a formal proof of the following statement:

Given a series $\sum_{n=-\infty}^{+\infty} a_n(z-P)^n$, there are R_1, R_2 , $0 \leq R_1 \leq R_2 \leq +\infty$, such that the series converges for any z such that $R_1 < |z-P| < R_2$ and diverges for any z with $|z-P| < R_1$ or $|z-P| > R_2$.