

1. Show that any function that is meromorphic in the extended plane is a rational function, i.e. the ratio of two polynomials.

2. If $f(z)$ is analytic and satisfies $|f(z)| \leq |z|$ in $|z| \leq 1$ then show that

$$\frac{|f'(z)|}{(1 - |f(z)|^2)} \leq \frac{1}{1 - |z|^2}$$