

MA/PHY507 Spring 2019
Problem Set 5
DUE: Monday, 25 February 2019

1. Find the radius of convergence of:

$$\sum_{n=1}^{\infty} \frac{z^{3n}}{2^n}.$$

Find the analytic function represented by this power series.

2. Arfken, section 11.5, page 496, problem 11.1.5. Assume the log is taken with the principle branch and explain where $\log_{PB}(1+z)$ is analytic. Establish the Taylor expansion of $\log(1+z)$ about the origin.
3. Arfken, section 11.5, pages 496–497, problems 11.5.7 and 11.5.8.
4. Find the Laurent expansion of $f(z) = z(z^2 + 1)^{-1}$ about $z_0 = i$ and state the maximal annular region on which the expansion is valid.