

Quiz–Power Series

The function $f(x) = \sum_{k=1}^{\infty} \frac{1}{k} x^k$ is defined on $|x| < 1$.

- (a) Compute a power series representation of $f'(x)$.
- (b) What is $f(x)$ as a function?
- (c) What is $\int_0^x f(x) dx$? Compute this as a power series, then try to interpret it as a function.

Show all work and clearly mark your final answer. No calculators/notes allowed. Partial credit will be given for correctly explaining any steps you're unable to carry out, as well as demonstrating correct methods with computational errors.