

Complex Analysis 1, MATH 5510, Fall 2017

Homework 10, Section IV.1 and IV.2 (modified)

Due: Thursday, December 7 at 1:40

Show all work!!! Justify every claim and show all computations.

IV.1.11. Let γ be the closed polygon $[1-i, 1+i, -1+i, -1-i, 1-i]$. Find $\int_{\gamma} \frac{1}{z} dz$. Use Proposition IV.1.8 and the definition of integral in terms of integrals of real and imaginary parts (Definition IV.1.12).

IV.1.19. Let $\gamma(t) = 1 + e^{it}$ for $t \in [0, 2\pi]$. Find $\int_{\gamma} \frac{1}{z^2 - 1} dz$. HINT: Use a partial fraction decomposition, and then apply properties of this section to simplify the integral before evaluating.

IV.2.6. Give the power series for $f(z) = \sqrt{z}$ about $a = 1$ and find its radius of convergence.

IV.2.9(a). Evaluate $\int_{\gamma} \frac{e^z - e^{-z}}{z^n} dz$ where $n \in \mathbb{N}$ and $\gamma(t) = e^{it}$ for $t \in [0, 2\pi]$.