Complex Analysis 1, MATH 5510, Spring 2022

Homework 10, Section IV.1

Due Saturday, April 9

Write in complete sentences!!! *Explain* what you are doing and convince me that you understand what you are doing and why. Justify all steps by quoting relevant results from the textbook or hypotheses.

IV.1.5. Let $\gamma(t) = \exp((-1+i)/t)$ for $t \in (0,1]$ and $\gamma(0) = 0$. Show that γ is a rectifiable path and find $V(\gamma)$. HINT: Show that γ is continuous from the right at $t = 0$. Use L'Hôpital's Rule to show that the right-hand derivative of γ exists at 0. Use Proposition IV.1.3.

IV.1.6. Prove that if $\gamma : [a,b] \to \mathbb{C}$ is a Lipschitz function then γ is of bounded variation.

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