Complex Variables, MATH 4337, Spring 2025

Homework 8: Section 3.30. The Logarithm Function, Section 32. Some Identities Involving Logarithms, Section 33. Complex Exponents

Due Saturday, April 5 at 11:59 pm

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 class notes, text book, or hypotheses. Use the notation and techniques described in the in-class hints. Do not discuss homework problems with others. If you have any questions, then contact me (`gardnerr@etsu.edu`). The exercise numbers are based on the 9th edition of the textbook.

3.33.3. Show that $\text{Log}\, i^3 \neq 3\text{Log}\, i$.

3.33.10. (b) Show that the function $f(z) = \dfrac{\text{Log}\,(z+4)}{z^2 + i}$ is analytic except at the points $\pm(1-i)/\sqrt{2}$ and on the portion $x \leq -4$ of the real axis.

3.36.2. Find the principal value of each.

    (a) $(-i)^i$.

    (b) $\left(\dfrac{e}{2}(-1 - \sqrt{3}i)\right)^{3\pi i}$.

3.36.3. (Graduate) Show $(-1 + \sqrt{3}i)^{3/2} = \pm 2\sqrt{2}$.