Complex Analysis 1, MATH 5510, Fall 2023

Homework 4, Section III.2. Analytic Functions

Due Saturday, October 7 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 textbook or hypotheses. Do not discuss homework problems with others. If you have any questions, then contact me (`gardnerr@etsu.edu`).

III.2.4. Show that $\frac{d}{dz}[\cos z] = -\sin z$ and $\frac{d}{dz}[\sin z] = \cos z$. Quote theorems and justify steps.

III.2.6. Describe the sets: **(a)** $\{z \mid e^z = i\}$.

(d) $\{z \mid \cos z = 0\}$. HINT: Use formula (2.14) and verify that the only solutions are the real solutions.

III.2.7. Use the definition of $\cos z$ and $\sin z$ to prove the formulas for $\cos z + w$ and $\sin z + w$. HINT: Start with the "big side" of the identity and simplify.