

Complex Variables, MATH 4337, Spring 2025

Homework 6: Section 21. Cauchy-Riemann Equations,

Section 22. Sufficient Conditions for Differentiability

Due Saturday, March 8 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.

2.24.1. (d) Use Theorem 2.21.A to show that $f'(z)$ does not exist at any point for $f(z) = e^x e^{-iy}$.

BEWARE: You do not know how to differentiate exponential functions with complex inputs (such as $-iy$).

2.24.3. (a) Use Theorem 2.21.A and Theorem 2.22.A to determine where $f'(z)$ exists and find its value for $f(z) = 1/z$.