PROJECT I - MATH 800
SPRING 2019
DUE ON FEBRUARY, 21

(1) Problem 19/page 23;
(2) Problem 29/page 24;
(3) Problem 34/page 25; Hint: Cauchy-Riemann
(4) Problem 47/page 26;
Hint: For $f = u + iv$, write $\ln(|f|) = \frac{1}{2}\ln(u^2 + v^2)$. Take derivatives and use the Cauchy-Riemann for u, v.
(5) Problem 52/page 27
Hint: To show the non-existence of a holomorphic f, so that $f : f'(z) = \frac{1}{z}$ argue by contradiction, by considering the path integral

$$\int_{|z|=1} f'(z)dz = \int_{|z|=1} \frac{1}{z}dz$$

(6) Prove that if a holomorphic function F on a connected domain satisfies $F'(z) = 0$, then $F = const.$
Hint: We have done similar result in class for real-valued C^1 functions.
(7) Problem 55/page 27 without the counterexample.
Hint: You have that on the connected intersection $U_1 \cap U_2$, there is $F_1' = F_2'$. Use the result in Exercise 6.
(8) Problem 29/page 65;
(9) Problem 37/page 66;
(10) Problem 42/page 66;