Exercise 1. Let $f$ be the complex function defined by $f(z) = \frac{\overline{z}^2}{z}$ when $z \neq 0$ and $f(0) = 0$.

a. Show that Cauchy-Riemann equations are satisfied for $f$ only at the origin 0.
b. Is $f$ differentiable at 0?
Exercise 2. Show that the function $u(x, y) = 2x(1 - y)$ is harmonic and find a harmonic conjugate $v$ of $u$. 
Exercise 3. Evaluate $\ln(i^3)$. Is $\ln(i^3) = 3\ln(i)$?
Exercise 4. Find all complex numbers $z$ such that $\sin(z) = 5$. 