Assignment 8 MA1124 March 14.

1. Prove that $\overline{A^c} = (A^o)^c$
2. Prove that $(\overline{A})^c = (A^c)^o$
3. Prove that if $f^{-1}(O)$ is open for every open set O then f is continuous.
4. Prove using ϵ and δ that $f(x) = \frac{1}{x}$ is continuous for all $0 \prec x \prec 1$. And the same way prove that $f(x) = x^2$ is also continuous for all $0 \prec x \prec 1$. Is there a difference between the relation between ϵ and δ in the two cases? Discuss.
5. Prove that $f^{-1}(\bigcap A_\alpha) = \bigcap f^{-1} A_\alpha$, and the similar result for unions.