

Additional Problems-Set 2

1 How many roots of the equation $z^4 + 8z^3 + 3z^2 + 8z + 3 = 0$ lie in the right half plane

2 Let u be a harmonic function on the annulus $ann(0, R_1, R_2)$. Prove that the average, for any $R_1 < r < R_2$,

$$\bar{u}(r) = \frac{1}{2\pi} \int_0^{2\pi} u(re^{i\theta}) d\theta$$

satisfies that

$$\bar{u}(r) = \alpha \log r + \beta$$

for some α and β with $\alpha = 0$ if u is harmonic in $B(0, R_2)$.