

NAME: _____

QUIZ 5

Problem 1. (6.6.7) Assume U is connected. Use (a) **(5 pts)** energy methods and (b) **(5 pts)** the maximum principle to show that the only smooth solutions of the Neumann boundary-value problem

$$\begin{cases} -\Delta u = 0 & \text{in } U \\ \frac{\partial u}{\partial \nu} = 0 & \text{on } \partial U \end{cases} \quad (1)$$

are $u \equiv \text{constant}$. (Hint: for b), use strong maximum principle and Hopf lemma.)