

King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics
Math 470 Quiz 6

Name : ID #.....

Question: For every x in the unit ball $B = B(\mathbf{0}, 1)$ of R^3 , let $u(x, y)$ be the solution of

$$\Delta u = 0 \quad \text{in } B; \quad u(x, y) = -\frac{1}{4\pi|y-x|} \quad \text{on } \partial B.$$

Show that the green's function

$$G(x, y) := u(x, y) + \frac{1}{4\pi|y-x|}$$

is harmonic in $B_x = B - \{x\}$.