

VANDERBILT UNIVERSITY

MATH 4110 – PARTIAL DIFFERENTIAL EQUATIONS

HW6

Question 1. In class, we proved a theorem about existence of solutions to Poisson's equation in \mathbb{R}^n . One of the steps of the proof consisted in showing that the function u defined via convolution with the fundamental solution of Laplace's equation is a C^2 function. In class, we showed that u is differentiable. Finish this step of the proof, i.e., show that $u \in C^2(\mathbb{R}^n)$.

Question 2. Our proof of existence of solutions to Poisson's equation dealt only with $n \geq 3$. Establish the theorem in $n = 2$. For this, follow what we did in class, making the necessary adjustments to the two-dimensional case.