Partial Differential Equations

Homework 2

due October 1, 2009

1. Let $U \subset \mathbb{R}^n$ be open and bounded. Let $\{u_m\}$ be a sequence in $C^\infty(\bar{U})$. Assume that there are functions $u \in W^{1,p}(U)$ and $v \in C^{0,\gamma}(U)$ such that

$$u_m \to u \quad \text{in } W^{1,p},$$
$$u_m \to v \quad \text{in } C^{0,\gamma}.$$

   Show that $u = v$ almost everywhere.

2. Evans, p. 290, Problem 6

3. Evans, p. 290, Problem 8

4. Evans, p. 290, Problem 9

5. Evans, p. 291, Problem 10

   Hint: Look at the proof of Morrey's inequality.

6. Evans, p. 291, Problem 13