

**MA633 Partial Differential Equations II**

**Spring 2012**

**Problem Set 3**

**February 17, 2012**

**DUE: Wednesday, 29 February 2012**

- (1) Prove that the Gagliardo-Nirenberg-Sobolev inequality extends to  $W^{1,p}(\mathbb{R}^n)$ , for  $1 \leq p < n$ .
- (2) Problem 8, page 307 of Evans, on the trace. To show  $T$  is unbounded, take  $U = B(1,0)$  and construct a sequence of  $L^p$ -functions living near the boundary of the ball whose  $L^p$  norm vanishes.
- (3) Problems 17, page 308 of Evans, on the chain rule.
- (4) Problem 18, page 308 of Evans, on the functions  $D_{\pm}u$ .