

Math 560  
Fall 2005  
Homework 10  
Assigned Monday, 14 November, 2005

1. I won't collect these, but you should be able to do problems number 1, 3, and 8 on pages 134-135.
2. (#5 on page 135) Let a function  $f$  be defined in an open set  $D$  of the plane, and suppose that  $f_1$  and  $f_2$  are defined and bounded everywhere in  $D$ . Show that  $f$  is continuous in  $D$ .
3. (#7, page 135) Let  $f$  and  $g$  be of class  $C^1$  in a compact set  $S$  and let  $f = g$  on the boundary of  $S$ . Show there must exist a point  $p_0 \in S$  so that  $\mathbf{D}f(p_0) = \mathbf{D}g(p_0)$ .
4. (#9, page 135) Let  $f(x, y) = xy$ . Show that the direction of the gradient of  $f$  is always perpendicular to the level lines of  $f$ .