M254H HW 6
Due Friday Feb. 28
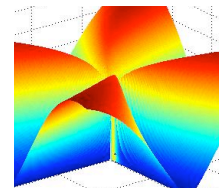
From Adams and Essex

Chapter	Page Number	Problems
12.6	712	2, 12, 17, 19
12.7	723-724	7, 14, 22, 28
12.8	734-735	5, 10, 14, 17

Non-Book Problems

1) Use an $\epsilon - \delta$ argument to prove that

$$f(x,y) = \begin{cases} \dfrac{x^4 + y^4}{(x^2 + y^2)^\alpha} & (x,y) \neq (0,0), \\[2mm] 0 & (x,y) = (0,0), \end{cases}$$

is differentiable at $(x,y) = (0,0)$ for $\alpha < \frac{3}{2}$.

2) Prove that

$$f(x,y) = \begin{cases} \dfrac{x^3 - xy^2}{x^2 + y^2} & (x,y) \neq (0,0), \\[2mm] 0 & (x,y) = (0,0), \end{cases}$$

is continuous at $(x,y) = (0,0)$ (use $\epsilon - \delta$), has first order partial derivatives at $(0,0)$, but is not differentiable at $(0,0)$.