MATH 376 HOMEWORK 2
DUE MONDAY FEB. 6

Section 8.9 2a,b, 3, 10-12
Section 8.14 1a,b, 2a

(1) Show that $f(x,y) = \dfrac{x^2y^2}{x^2+y^2}$ has a limit as $(x,y) \to (0,0)$.

(2) Let $f, g, h : \mathbb{R}^n \to \mathbb{R}$ and suppose that for $\vec{x} \neq \vec{a} \in \mathbb{R}^n$ we have $h(\vec{x}) \leq f(\vec{x}) \leq g(\vec{x})$. Prove that if $\lim_{\vec{x}\to\vec{a}} h(\vec{x}) = L$ and $\lim_{\vec{x}\to\vec{a}} g(\vec{x}) = L$ then $\lim_{\vec{x}\to\vec{a}} f(\vec{x}) = L$.

(**Hint:** Subtract L from the above inequality and think about what happens when you take the absolute value. There will be two cases.)