Problem 3:

(i) Prove that if $f$ is continuous at $l$ and $\lim_{x \to a} g(x) = l$, then 
\[ \lim_{x \to a} f(g(x)) = f(l). \]

(ii) Show that if continuity of $f$ at $l$ is not assumed, then it is not generally true that $\lim_{x \to a} f(g(x)) = f(\lim_{x \to a} g(x))$. Hint: Try $f(x) = 0$ for $x \neq l$, and $f(l) = 1$. 

Tuesday, 10-21