Brief answer to selected problems in HW10

1. Section 5.3:

   Problem 87: We take for granted from the problem that a continuous function on a closed interval $[a, b]$ must be uniformly continuous (ie. Assume this statement is correct. This is an advanced calculus Theorem).

   Therefore given $\epsilon > 0$, one can find $\delta > 0$ such that $|x_1 - x_2| < \delta$ implies $|f(x_1) - f(x_2)| < \epsilon$. It is not difficult to see that for this δ, $\|P\| < \delta$ implies $U - L < \epsilon(\sum_k \Delta x_k) = \epsilon(b - a)$.

2. Section 5.4:

   Problems 84: Use L'Hôpital's rule to get the limit. Answer $= 2$.

   Problems 89: $F(x) = \int_1^{x^2} \sqrt{1 - t^2}dt$. $F'(x) = 2x\sqrt{1 - (x^2)^2}$. $F''(x) = \frac{2(1-3x^4)}{\sqrt{1-x^4}}$.