Brief answer to selected problems in Homework 10

1. Section 5.1: $A_n(r) = 2n\frac{1}{2}(r\sin\frac{2\pi}{2n})(r\cos\frac{2\pi}{2n})$.

2. Section 5.3:

   Problem 87: We take for granted from the problem that a continuous function is 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 $U - L < \epsilon(\sum_k \Delta x_k) = \epsilon(b-a)$.

3. Section 5.4:

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

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