Advanced Calculus: 15-Minute Quiz 06

Name : _____ Student ID # : _____ Score : _____

Let $h_n(x) = n^2 x e^{-nx}$.

(a) Show that $\{h_n(x)\}$ converges to the zero function on the interval $[0, 1]$.

(b) Show that $\lim_{n\to\infty} \int_0^1 h_n(x)\, dx = 1$.

(c) Find the maximum of $h_n(x)$ on the interval $[0, 1]$. Explain why the result of part (b) does not contradict Theorem 8.11.