Rudin Ch. 8, Problem 22.
If f is Riemann integrable on $[a, b]$, prove that there are polynomials P_n such that

$$\lim_{n\to\infty} \int_a^b |f(x) - P_n(x)|^2 \, dx = 0$$

January 2000, Problem 4.
Use the Weierstrass approximation theorem to show that if f is continuous on $[0, 1]$ and $\int_0^1 f(x)x^n \, dx = 0$ for all non-negative integers n, then f is identically zero on $[0, 1]$.