Fourier Series: L_2 Convergence and Parseval's Identity- HW Problems

1. Use Parseval's identity on the Fourier series for
$$f(x) = x; \ -\pi \leq x < \pi$$
(See problem 3 in the previous HW set) to find $\sum_{n=1}^{\infty} \frac{1}{n^2}$.

2. Use Parseval's identity on the Fourier series for
$$f(x) = (\pi - x)^2; \quad 0 \leq x \leq 2\pi$$
(See problem 5 in the previous HW set) as a way to find $\sum_{n=1}^{\infty} \frac{1}{n^4}$.