Homework Problems for Chapter 11, Section 12

(1) Find a Taylor polynomial with center 0 that approximates $\cos x$ with an accuracy better than 10^{-16} over the interval $-0.1 \le x \le 0.1$.

(2) Find a Taylor polynomial with center 0 that approximates e^x with an accuracy better than 10^{-10} over the interval $-0.1 \le x \le 0.1$.

(3) Approximate the definite integral $\displaystyle\int_0^{1/2} e^{-x^4}\, dx$ with an accuracy better than 10^{-9}. Hint: Use a Maclaurin series.

(4) Find $\displaystyle\lim_{x \to 0} \frac{2x - (4/3)x^3 - \sin(2x)}{\left(3x - \tan(3x)\right)\left(1 - \cos(5x)\right)}$. Do not use l'Hôpital's Rule.