2142 Sample Problems #1

These are problems on Taylor polynomials. The polynomials themselves are plugging into a formula. The difficult part is to estimate the error or remainder. In order to write either the polynomials or the remainder, you need numbers like $n!$ or x^k. It is silly to calculate something like 100! when we can use a easily available program to do the computation. I suggest you use Wolfram Alpha. The URL is

http://www.wolframalpha.com

The syntax you should use is n! if n is a single digit or (n)! if n has more than one digit. The syntax for x^k is `(x)^(k)` where the parentheses can be omitted if a number has only one digit and no decimal points.

Using $\Sigma_{k=0}^{n}$ which equals the following within the stated accuracy:

(1) $\sin .5$; error $< 10^{-18}$
(2) $\cos .3$; error $< 10^{20}$
(3) e; error $< 10^{-3}$
(4) $\pi/4$; error $< 10^{-3}$ (use the Taylor polynomial for arctan. It is an integral of a well-known function.)