

ChEE 201
Computer Homework 4

You need to have read Computer Handout 4 before attempting this homework.

This homework will have you:

- 1) use the Taylor series approximation to estimate functions
- 2) demonstrate you know how to use approximate relative error as a stopping criteria for your approximations

Note: None of this homework assignment should be done in VBA, but some may be done in Excel. You are asked to calculate everything by hand or with a calculator or Excel and no programming is required.

Estimate $\ln(2)$ choosing x_i as 1. In Excel, make a table like in Reading 4 that has the number of terms that have been included and the approximate relative error. Include enough terms that you reach an absolute relative error magnitude less than 0.01.

This looks like a short assignment...It is not.

You should look for an infinite series trend like those encountered in class to write your own infinite series to describe this slowly convergent series. Write the first 3-5 terms and look for a pattern. Report your infinite sum that you develop for full credit. Implement this function in Excel to calculate the new terms and to find the approximate relative error. Report the final true error that results when your approximate relative error is 0.01 or less.

For your answer, report only your infinite sum representation, the number of terms it took you to reach convergence, and the true error. You may include your Excel sheet or your hand calculations to support what you did, but only these three pieces of information will be evaluated. Clearly box your answers so they are easy to find. Unboxed answers for each part will not be graded.