Section number:

Name of recitation instructor:

Names of team members:

Exercise 1 Following the instructions given in the lab document, give an upper bound of the difference between the fifth degree Maclaurin polynomial for $\ln(1+x)$ and the full Maclaurin series on the interval $[-0.9, 0.9]$, using that the difference is at most $\sum_{n=6}^{\infty} |x|^n$. Do the same for the 200th degree Maclaurin polynomial.

Max difference for fifth degree case is :

Max difference for 200th degree case is :

Space to show your work:

Exercise 2 Let $Tf(x)$ be the Maclaurin polynomial of degree N for $\ln(1+x)$, in other words, $Tf(x) = \sum_{n=1}^{N} \frac{(-1)^n x^n}{n}$. What is the smallest N that guarantees $|Tf(1) - \ln(1+1)| \leq 10^{-8}$? (You just need to estimate N to within one order of magnitude.)

$N \approx$

Exercise 3 Let $Tf(x)$ be the Maclaurin polynomial of degree N for $\ln(1+x)$. What is the smallest N that guarantees $|Tf(-0.5) - \ln(1+(-0.5))| \leq 10^{-8}$? (You should be able to find the exact value this time even with trial and error.)

$N \approx$

Exercise 4 Discuss why the method used for Exercise 3 performs so much better than the method used for Exercise 2, as a method to compute the value of $\ln(2) = \ln(1+1)$. (Hint: something is special about $x = 1$ when it comes to the Maclaurin series for $\ln(1+x)$.)