

## Math 1XX3 Winter 2013 Maple Lab 3

Your worksheet should either be handed in in class on Tuesday April 9 or be given to Sheree Cox in HH-218 on Wednesday April 10 before 4:30.

**Instructions** This lab is about using Maple to find limits and hence determine convergence of series, and to calculate Taylor polynomials. Read through Sections 9.1, 9.2, 9.3, 9.5 of the CalcLab manual. Then do the following problems. You should hand in a Maple worksheet (with your name on it) that includes your commands and the solutions to the problems (*clearly indicate* where to find the solutions). Clean up the worksheet so that any mistakes you made in the process are eliminated from view.

1) Test the following series for convergence by using Maple to calculate appropriate limits.

a) 
$$\sum_{n=2}^{\infty} \frac{(\ln(n))^3}{n \ln(n^{4 \ln(n)})}$$

b) 
$$\sum_{n=1}^{\infty} (2^{1/n} - 1)^n$$

c) 
$$\sum_{n=2}^{\infty} \frac{1}{n 2^n} \ln\left(1 - \frac{1}{n^2}\right)$$

2) Consider the function  $f(x) = x^{4 \ln(x)}$ .

a) Use Maple to find the degree 5 Taylor polynomial  $T_5(x)$  for  $f(x)$  around 2.

b) Plot  $f(x)$  and  $T_5(x)$  on the same axes to see how close the graphs are to each other. You will probably need to use several different domains in order to get reasonable pictures. Remember to stay away from 0!

c) Using your graphs, estimate the interval around 2 on which  $T_5(x)$  differs from  $f(x)$  by less than 1.