

MATH 114 – MAPLE ASSIGNMENT 3 – DUE 16 JUNE 2008

Answer all of the following questions. You may work in groups of no more than three persons to complete this assignment. One copy of the completed assignment is to be turned in for each group. Each member of the group must sign the assignment.

You are expected to turn in a printout of a MAPLE worksheet containing the MAPLE commands and output that you used to complete the assignment. You must also include text explaining what you are doing (this can be typed onto the MAPLE worksheet or written by hand on the printout). Include any hand calculations.

This assignment is due at the beginning of class on Monday, June 16, 2008. No late assignments will be accepted under any circumstances whatsoever. If you are not finished with the assignment by the due date, you should turn in what you have for partial credit. You may turn in the assignment early if you wish.

1. (5 pts. each) Consider the series $\sum_{n=1}^{\infty} a_n = \sum_{n=1}^{\infty} \frac{(\ln(n))^5}{n^{3/2}}$.
 - (a) Use MAPLE to evaluate the integral $\int_1^{\infty} \frac{(\ln(x))^5}{x^{3/2}} dx$. Applying the Integral Test (Theorem 9, p. 757), determine if the above series converges or diverges.
 - (b) Use MAPLE to find $a_1, a_5, a_{10}, a_{100}, a_{500}$, and a_{1000} where $\{a_n\}_{n=1}^{\infty}$ is the *sequence of terms* for the above series. Use MAPLE to find $\lim_{n \rightarrow \infty} a_n$.
 - (c) Use MAPLE to find $s_1, s_5, s_{10}, s_{100}, s_{500}$, and s_{1000} where $\{s_n\}_{n=1}^{\infty}$ is the *sequence of partial sums* for the above series. Use MAPLE to find $\lim_{n \rightarrow \infty} s_n = \sum_{n=1}^{\infty} a_n$ accurate to 8 decimal places.
2. (5 pts. each) Consider the series $\sum_{n=1}^{\infty} a_n = \sum_{n=1}^{\infty} \frac{\cos^5(n)}{n^{1/2}}$.
 - (a) Use MAPLE to find $a_1, a_5, a_{10}, a_{100}, a_{500}$, and a_{1000} where $\{a_n\}_{n=1}^{\infty}$ is the *sequence of terms* for the above series. Use MAPLE to find $\lim_{n \rightarrow \infty} a_n$.
 - (b) Use MAPLE to find $s_1, s_5, s_{10}, s_{100}, s_{500}$, and s_{1000} where $\{s_n\}_{n=1}^{\infty}$ is the *sequence of partial sums* for the above series. Use MAPLE to *try to* find $\lim_{n \rightarrow \infty} s_n = \sum_{n=1}^{\infty} a_n$. Do you think the series converges?