

Maple Lab # 4

Calculus 2, Sections 13-16

Due: Monday, April 28, 2003

You are encouraged to collaborate on all phases on this project. However it is expected that each student will prepare their own write-ups, using their own words and reflecting on their own insight. Any hint of exchanging files or copying sentences or phrases will be considered an act of academic dishonesty. In particular making an electronic version of a computer file available to another student will be treated as a dishonest act.

1. Use Taylor's Theorem to obtain an upper bound for the error of the approximation

$$\cos(0.3) \approx 1 - \frac{(0.3)^2}{2!} + \frac{(0.3)^4}{4!}$$

and then use maple to find the exact error, that is

$$\cos(0.3) - \left(1 - \frac{(0.3)^2}{2!} + \frac{(0.3)^4}{4!}\right)$$

(Hint: The error formula for an n^{th} Taylor Polynomial about c at the point x is $R_n(x) = \frac{f^{n+1}(z)}{(n+1)!}(x - c)^{n+1}$ for some z . In this case $c = 0$ and $x = .3$)

2. Use maple to graph the partial sum S_{50} and identify the function from the graph.

$$f(x) = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n}}{(2n)!}$$