

# MATH 271 – Homework #10

due 9 April 2009

**All computer calculations must be done in Maple. These can be supplemented by work to be handed in on paper.**

1) Consider the integral

$$\int_0^5 (x+2)e^{-x},$$

which we wish to approximate with an error of not more than 0.00001. How many subintervals must we use if we employ

- a) the trapezoid method?
- b) Simpson's method?

After you have determined the number of subintervals, do the necessary computations to confirm that the error is indeed not more than 0.00001.

2) Use the Maclaurin series for  $\cos x$

$$\cos x = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \dots$$

to estimate  $\cos 5$ . How many terms of the series must be used to ensure that the error is not more than 0.00001? Use the error estimation formula

$$R_n(x) = \frac{f^{(n+1)}(c)}{(n+1)!}(x-a)^{n+1}.$$

After you have determined the number of terms, do the necessary computations to confirm that the error is indeed not more than 0.00001.