Math 202(01) **Simpson's Rule Worksheet** **9 March 2004**

The goal here is to use Simpson's rule to estimate $\ln 10$ as accurately as possible, using only addition, multiplication, subtraction, and division.

1. Use Simpson's rule with $n = 36$ subintervals to estimate $\int_1^{10} \frac{dx}{x}$. (The exact value of this integral is $\ln 10$, so you're finding a decimal approximation for $\ln 10$.)

2. Use the Simpson's rule error bound to find the greatest possible error in your estimate in part 1. Give upper and lower bounds for the possible values of $\ln 10$.

3. How large would n have to be for a Simspon's rule estimate of $\int_1^{10} \frac{dx}{x}$ to guarantee an error of less than 10^{-6}?

4. Use Simpson's rule to estimate $\int_1^{10} \frac{dx}{x}$ with an error of less than 10^{-6}.