31/B - Practice Midterm 2

October 28, 2011

1. (20 points) Determine whether or not the integral

$$\int_0^1 x^2 \ln x \, dx$$

converges. If it converges, compute the integral.

2. (20 points) Determine whether or not the integral

$$\int_0^\infty \frac{dx}{x^2 e^{2x^3} + x^5}$$

converges. If it converges, compute the integral.

3. (20 points) Find an N such that Simpson's rule S_N for the integral

$$\int_0^1 x e^{x^2} \, dx$$

has error of less than 10^{-9}.

4. (20 points) Find the partial fraction decomposition of

$$f(x) = \frac{4x^2 - 20}{(2x+5)^3}.$$

5. (20 points) Use Taylor polynomials and the error bound to compute the number e with an error of at most 10^{-3}.