Math 250a (Fall '07) - Homework 11 extra problem

1. This problem is about the definite integral

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

(a) Find the exact value of this integral.
(b) Use the program to compute the LEFT approximation for $N = 10, 20$ and 40. Find the error in each of the three cases.
(c) Use extrapolation with $N = 10, 20$ to find a better approximation and compute its error. Now use extrapolation with $N = 20, 40$ and find its error. What do you think is the order of the extrapolation method using the LEFT rule?
(d) Repeat (b) and (c) using the trapezoid rule instead of LEFT. What is the order now?