

Home work 8: Due Tues. April 12, 2016 Math 2335 Spring 2016

Name: _____

(1) Consider using the trapezoid rule with one interval $T_1(f)$ to evaluate $\int_0^1 f(x) dx$. Show that there is no error (i.e. the trapezoid rule is exactly equal to the integral) if f is any line— $f(x) = mx + b$. (Hint: Consider the two functions $f_0(x) = 1$, and $f_1(x) = x$.)

(2) Consider evaluating the following integral using a numerical integration method.

$$\int_{-1}^1 e^{\sqrt{|x|}} dx \quad (\text{the exact value is } 4)$$

(a) Find $T_4(f)$ and compute $E_4^T(f)$.

(b) Find $S_4(f)$ and compute $E_4^S(f)$.

(c) Find $I_3(f)$ (Gaussian quadrature), and compute the error $\text{Err}(I_3(f))$.