Homework Assignment 11 Due on Friday 12/20

Programming Problems:

1. Write a Matlab code that performs composite Gaussian quadrature rule with 2 points or 3 points to approximate $\int_a^b f(x) dx$. Your code should take f, a, b and n as input data, where n is the number of the subintervals, i.e. $h = \frac{b-a}{n}$.

Writing Problems:

Do the following exercise problems in the text book by Bradie, Sec 6.6: 1(c), 2*, 4*, 5*, 11*, 21*, 28, 31*, 32* Just turn in problems with *.

Bonus Problems: (Add one point in the final grade.) Let $P_n(x)$ be a family of orthogonal polynomials with respect to the weight function w(x), that is, $\deg(P_n(x)) = n$ and $\int P_n(x)P_m(x)w(x)dx = 0$ for $m \neq n$. Prove that there exists numbers a_n, b_n, c_n such that

$$P_{n+1}(x) = (a_n x + b_n)P_n(x) + c_n P_{n-1}(x)$$