1.
The number of different values of x are 101, which are evenly spaced from 0 to 1 with a distance of 0.01, except from the last value of x. Because when x=0, K(x) will be positive infinity, So the last value of x was chosen to be 1-tolerance. The tolerance I choice for the calculation is 10^{-6}. Data of 101 different (x, K(x)) points was generated by code in lab5.cpp, and plotted by lab5plot.m. Plotting of function K(x) is in Figure 1.

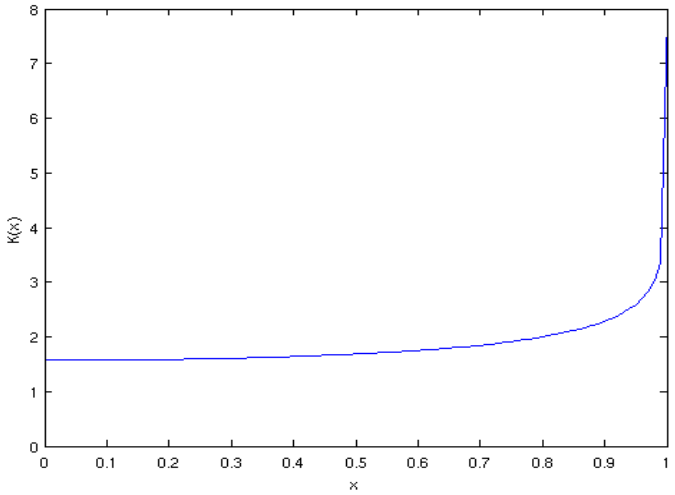

Figure 1: Value of K(x) as a function of x is indicated as the blue line.

2.
Data of 101 different (x, n) points was generated by code in lab5.cpp, and plotted by lab5plot.m.The number of n related to different value of x was plotted as Figure 2:

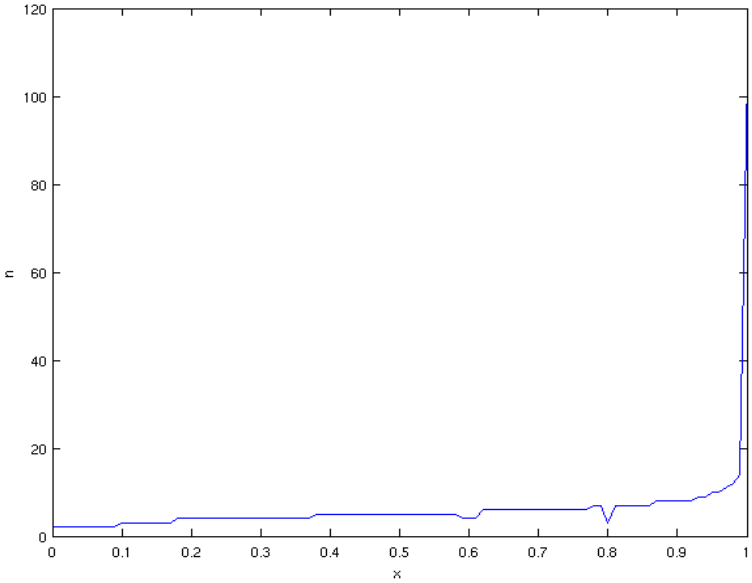

Figure 2: Blue line in this figure indicate the value of n as a function of x.
From Figure 2, we can see that as x increase form 0 to 0.9, the n is also increasing slowly(although fluctuation exist). When x increase form 0.9 to near 1.0, the n increase more and more significantly.

3

When x=0.5, integrand was got by executing code in lab5.cpp, and the result was plotted by lab5plot.m, the integrand was in Figure 3.

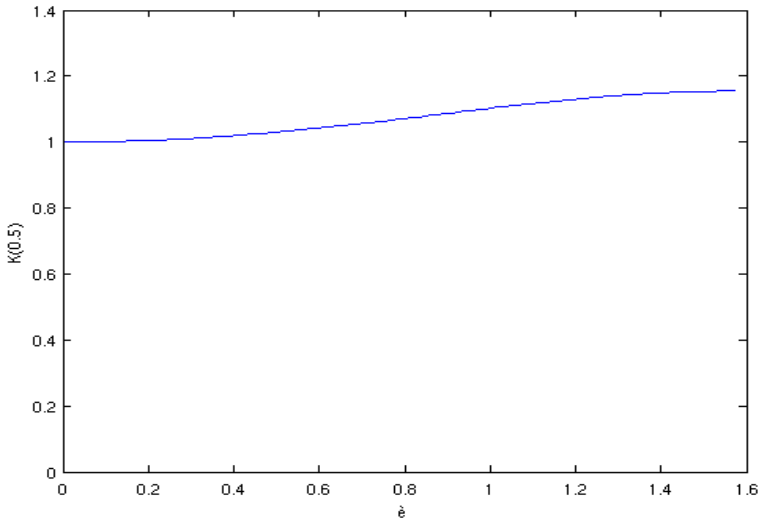

Figure 3. Blue line indicate the value of K(0.5) related to θ from 0 to π/2

The 5 Gauss nodes and their weights, the 11 Kronrod nodes and their weights, were plotted in Figure 4 and Figure 5 separately(the blue stars).

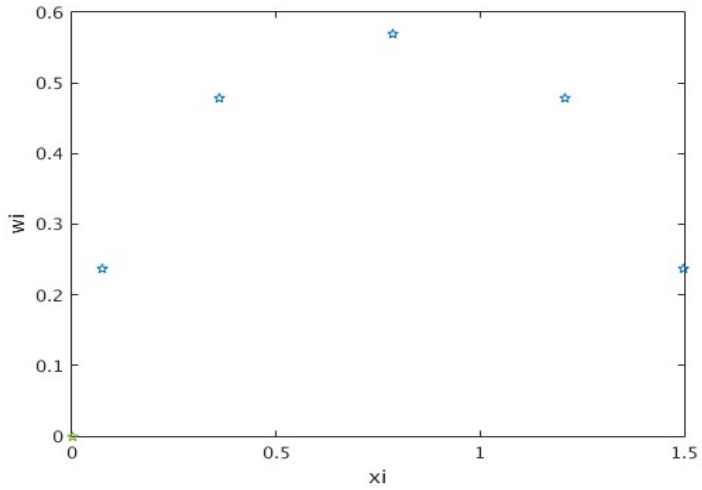

Figure 4. The blue stars are the Gauss nodes at xi and their value wi

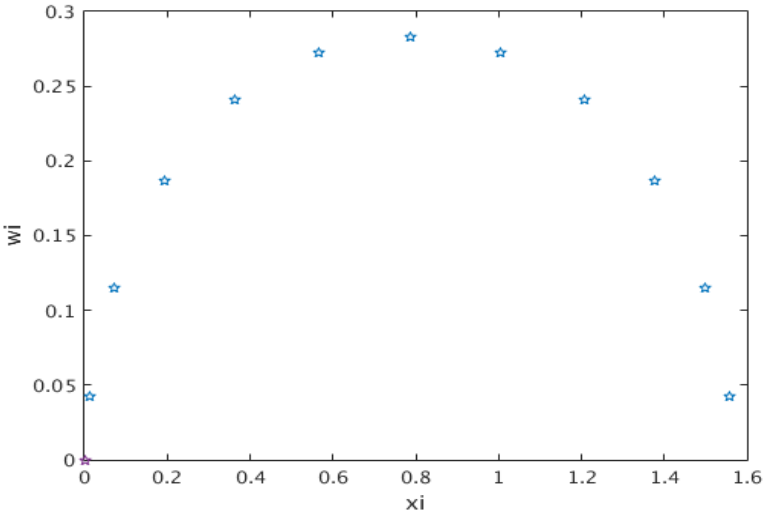

Figure 5. The blue stars are the Kronrod nodes at xi and their value wi