**Project of Advanced Engineering Mathematics**

**First Term 1401-1402**

Solve the following ordinary differential equation using orthogonal collocation with (1, 3, 5, 7, 9, 11, 13, 15, 17, 19 and 21) internal interpolation points:

$$y"+2y=x^{2}, 0<x<1$$

Subjects to the boundary conditions:

$$y^{'}(0)=0, y^{'}(1)+3y(1)=1$$

Consider $α=0$ and $β=-{1}/{2}$.

Obtain the exact solution to this ODE and compare it with the results obtained using the orthogonal collocation method.