Math 301 Quiz #5a
Name:..... ID:.....

Exercise # 1: Consider the Sturm-Liouville problem

$$\begin{cases} y'' - 2y' = 5\lambda y,\ 0 < x < 1 \\ y(0) = 0,\ y(1) = 0 \end{cases}$$

(1) Write the differential equation in self-adjoint form. Is the SLP regular ? if yes find the weight function and an orthogonality relation.

(2) Find the eigenvalues and corresponding eigenfunctions.

(3) Expand $f(x) = e^x$, $0 < x < 1$, in an eigenfunctions expansion.