

Math 301 Quiz #5 Summer 2014

Name:..... **ID:**.....

Exercise # 1: Consider the Sturm-Liouville problem

$$\begin{cases} y'' + y' = \lambda y, & x \in (0, 1) \\ y(0) = 0, y(1) = 0 \end{cases}$$

- a) Is it regular ?
- b) Find the weight and associated inner product
- c) Find the eigenvalues and associated eigenfunctions

Exercise #2: Find the first three terms of the Legendre series expansion
of

$$f(x) = x^2 + 1, \quad -1 < x < 1$$