Question 1. Find the half-range cosine expansion of

\[ f(x) = \begin{cases} 
1 & 0 < x < 1/2 \\
0 & 1/2 \leq x < 1 
\end{cases} \]
Question 2. Put the following equation in self-adjoint form and find the weight function.

\[ x^2 y'' + xy' + \lambda y = 0 \]