Consider equation

$$\epsilon y'' + (1 + x^2)y' - xy = 0.$$  \hspace{1cm} (1)

1. Perform an asymptotic match to obtain the 0-th order approximation of the inner solution around $x = 0$ for equation (1) with boundary conditions $y(0) = 1, y(1) = \sqrt{2}$. After the match, the coefficient of the exponential term in the inner solution evaluates to zero. Why?

2. Perform an asymptotic match to obtain a uniformly valid \textit{two-term expansion} for equation (1) with boundary conditions $y(0) = 2, y(1) = \sqrt{2}$.

3. \textbf{(Bonus +20\%)} Using Maple to evaluate integrals, find the three-term approximation of the inner solution for equation (1) with boundary conditions $y(0) = 2, y(1) = \sqrt{2}$. 