58. Find perturbation series in $\epsilon$ including terms up to $\epsilon^2$ for each of the roots of $x^2 + x + 6\epsilon = 0$.

59. Find three nonzero terms in the perturbation series solutions of $x^3 - x^2 + \epsilon = 0$. [Hint: This is not a regular perturbation problem- why?]

60. Find three nonzero terms in the perturbation series solution(s) of $x^2 + e^{\epsilon x} = 10$. [If there is more than one solution, you must find the series for each solution.]

61. Use perturbation techniques to find an approximation of the solution of $y'' = y \sin x$, $y(0) = 1$, $y'(0) = 1$.

62. Find three nonzero terms in a perturbation series solution of $y'' + y + \epsilon y^3 = 0$, $y(0) = 0$, $y(\pi/2) = 1$.

63. Find two nonzero terms in a perturbation series solution of $y'' + y + y^3 = 0$, $y(0) = 0$, $y(\pi/2) = \epsilon$. [Hint: Simply looking at $O(1)$ and $O(\epsilon)$ will not be adequate.]