Math 46 Homework 4
Due April 24 at the beginning of class

(1) Page 102 # 10. This is an exploration of perturbation in a different setting. You will discover how sensitive is the solution to the linear system $A\boldsymbol{x} = \boldsymbol{b}$ to changes in the matrix elements. To find the exact solution, you will find it easier to solve the equations simultaneously equations instead of using an augmented matrix. Also answer:
   i) For what value of ϵ does everything become "special?" (Is 0.01 near this?)
   ii) Write a 2-term perturbation expansion (in ϵ) for x, y. By roughly what factor do small ϵ changes from zero get amplied?
(2) page 123 # 10. (First please check errata).
(3) page 133 # 1. This is a *baby* initial layer problem: a rapidly-responding linear system being driven by a slower function. Please state what order the uniform convergence of the residual is.
(4) page 134 # 3.
(5) page 141 # 1. (rewrite λ in terms of more usual ϵ)
(6) page 141 # 2.
(7) page 141 # 3.
(8) page 150 # 11. This should be easy.
(9) page 150 # 13. Do at least 3 terms, and you get a BONUS for spotting the pattern and writing the general term.