Your Name: ______________________________

Your TA name: ____________________________

Section day: ______________________________

**MAE 325, Homework 1**
(Due Wednesday September 1, 1999 at the start of lecture, 9:04 AM.)

Put this sheet on top. Staple any computer work in with your homework in appropriate places. Every page of computer work must have your name printed by the computer and highlighted or circled with a colored pen. Do not hand in computer ramblings. Your computer work, like your other work, should be clear and complete. It is ok to do some documentation by hand on computer output pages.

**1)** Make sure you can do all the tutorials and all problems in the tutorials in Pratap's MATLAB 5 book. Study chapter 3 (all), chapter 4.1-3, and chapter 5.1.1-5.1.3. If you are game, you can try to learn chapter 8 on symbolic math. The symbolic command `solve` most closely mimics the features of TKSolver that our textbook uses. But it is a fussy and erratic command. On cornell machines you can use the command `fsolve` that comes with the Matlab optimization toolbox. Unfortunately `fsolve` is not included in the student edition.

For your solution, write one of the following two sentences, substituting appropriate names and dates.

a) I feel relatively comfortable being asked to wrok things out in MATLAB. I took CS 100A/B in the fall/spring of 199__ with professor X.
b) I feel I am unprepared to work things out in MATLAB. I took CS 100A/B in the fall/spring of 199__ with professor X.

**2)** Solving linear equations in MATLAB.

a) Write 4 linear equations in 4 unknowns that are different from those of any of your friends and not simple looking.
b) Find their solution using Matlab.
c) Check the solution in Matlab.
d) Check one of the 4 equations explicitly.
e) Do this problem again as many times as you can using fundamentally different strategies (e.g., matrix solution with backslash, the `solve` command, other methods?).

**3)** Consider a 30 cm chopstick in a slippery 20 cm diameter hemispherical bowl. Modeling the chopstick as a thin homogeneous rod, at what angle is it in equilibrium. A numerical answer is desired (in radians and degrees). There are many ways to solve this problem. You may use MATLAB any of a number of ways to try to find a solution of this problem. Extra credit for multiple solutions that are vastly different in approach. As for all problems this semester. A problem is not counted as done correctly unless:

- a clear free body diagram is drawn (if equations of force or moment (linear or angular momentum) balance are used,
- units are correctly accounted for,
- vector notation is clear and correct,
- answers are well labeled and are checked for reasonableness by any means readily available,
- you fully give credit for all consultations of all kinds that helped you to your solution (to not do so is a violation of the code of academic integrity).