Lab Assignment # 1

Due: Thurs. Sep. 11, 2008

Directions: solve the following problems. Use MATLAB to calculate your answers; make sure you define the values given in the problem and store the solution as a variable. Copy the *relevant* input/output from MATLAB's command window and paste it on a text document. Label your work so that i can follow it and save it in your own drive (USB flash drive or csun's udrive).

You can work with others and discuss the problems, but each student must write his/her own, independent solution. If you are unsure about what i mean by this, please ask!

What to turn in? Sort the solutions of the assigned problems –in increasing order, including a printout of the text document described above and the plots you created, staple the pages together, and write your name, student ID, MATH396 and LAB # 1 in the front page.

Problem 1. Create a vector named `x1` with 15 elements that range from 3 to 59 in increments of 4. Then, using the colon operator to index into `x1`, create a new vector named `x2` with 8 elements that include the first four elements of `x1` and the last four elements of `x1`.

Problem 2. The formula

$$C_{k,n} = \binom{n}{k} = \frac{n!}{k!\,(n-k)!}, \tag{1}$$

gives the number of ways to choose k distinct objects from a set n objects ($n > k$). How many different lineups of 6 players can be made from a team of 14 players?

Problem 3. The command `x = linspace(a,b,N);` produces a vector `x` of `N` equally spaced points in the interval $[a, b]$. The command `y = a:(b-a)/N:b;` produces a vector similar vector `y`. Try these commands with `a = 0.5`, `b = 2.0`, and `N = 100`. What is the difference between `x` and `y`? Do both vectors have the same size?

Problem 4. Use the command `linspace` to create a vector `x` of 200 equally spaced points in the interval $[0, 2\pi]$, and the plot command to create a plot of (a) `sin(x)`, (b) `cos(x)`

Problem 5. Use the command `linspace` to create a vector `x` of 100 equally spaced points in the interval $[-1, 1]$, and the plot command to create a plot of (a) $\mathtt{x}^2$, and (b) `exp(x)`

Problem 6. Eggs are packed in containers such that 18 eggs are packed in each container. Use MATLAB's function `ceil`, determine how many containers are needed to package 634 eggs.

Problem 7. The magnitude M of an earthquake on the Richter scale is given by:

$$M = \frac{2}{3} \log \frac{E}{E_0} \tag{2}$$

where E is the energy released by the earthquake, and $E_0 = 10^{4.4}$ Joules is a constant (energy of a small reference earthquake). Determine how many times more energy is released from an earthquake that registers 7.1 on the Richter scale than an earthquake that registers 6.9.

Problem 8. What is the smallest positive real number MATLAB can handle (also known as machine epsilon)?