Math Tune up Summer 2008
MATLAB Exercises
Wednesday August 6

1. Create a list named F that contains everyother number between 5 to 30, and create a new list S containing the cubes of each element in F.

2. Define the variables M=gallery(3) and N= magic(3). For each matrix, compute its eigenvalues, eigenvectors and characteristic polynomial. Are they diagonalizable? Evaluate the matrix in its characteristic polynomial. What theorem justifies the result you obtained? Can you tell what is special about these two matrices?

3. Compare the results obtained by doing the following matrix operations

   A=ones(3);

   B=[1 2 3; 0 1 0; 2 1 2];

   $A. * B, A * B, B * A, B * \text{eye}(3), B * 1, A.\hat{} 2, A\hat{} 2$

4. Plot $\cos(x)$ on the interval $[-\pi, \pi]$, by using the following step sizes: 1, 0.5, 0.1, 0.001. What difference do you notice? Replot any of those graphs and put a small red circle on each point of the graph. Plot the four graphs in the same window.

5. Plot the surface $f(x,y) = x + y^2$ together with some contour plots. Explore the commands mesh, contour, surf and surfc.

6. Open your web browser and go to

   http://www.mathworks.com/moler/ncmfilelist.html

   and download the file blackjack.m. Type blackjack in the command window(check the current directory!). Have fun!