Mathematica Assignment

In this course, you will often need to use a computer algebra system, whether to plot functions, numerically approximate solutions of differential equations, or work with matrices. Since Mathematica is what I know best, it is the software I can help you with the most, so I would like you to learn how to work with it too. You might want to work on this with a friend – it will save you time. However, the work that you hand in should be what *you* entered into Mathematica, so each person should have their own document printed out!

You can watch an online Tutorial on using Mathematica at the following URL. (You should be able to click on the embedded link.)

`http://www.wolfram.com/broadcast/screencasts/handsonstart/`

After watching the online Tutorial, do the following exercises and print out what you have.

1. Plot the sine of x function, with x ranging from -5 to 5.
2. Solve the differential equation $y' = 3y^{1/2} + 1$ with $y(0) = 1$. You will want to look at the NDSolve command in the Documentation Center.
3. Plot the answer with x in the interval $[0, 4]$.
4. Do a search on "matrix inverse" in the documentation center. Then find the inverse of the matrix

$$\begin{pmatrix} 2 & 5 & 4 \\ 3 & 7 & 1 \\ 2 & 9 & 8 \end{pmatrix}$$

5. Look up the command for finding the eigenvalues and eigenvectors of a matrix. Find the eigenvalues and eigenvectors of the above matrix.