

Math 2270-2 Maple Project I

Part A: some matrix algebra questions

(These questions are modified from problems on page 27 of the text *Multivariable Mathematics with Maple*, by J.A. Carlson and J.M Johnson.) You are to create a document in which you answer the following questions, via a mixture of Maple computations and textual insertions. You are to print out a copy of this document to hand in, as part A of your first Maple project. Don't forget to put your name and section number on it!

Define

$$A := \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$$

$$B := \begin{bmatrix} 2 & 1 & 0 \\ 1 & 2 & 1 \\ 0 & 1 & 2 \end{bmatrix}$$

- 1a) Compute AB and BA . Are they the same?
 - 1b) Compute $A+B$ and $B+A$. Are they the same?
 - 1c) Define C to be $A+B$. Compute C^2 and compare it to $A^2 + 2AB + B^2$. Are they the same? Can you think of a small change you could make in the expression " $A^2 + 2AB + B^2$ " in order to make it equal to C^2 ? Justify your answers!
 - 1d) Define $v=(1,2,3)$ to be a vector. Compute Av . What does Maple give you when you try vA ?
 - 1e) Solve $Bx=v$ for x , where v is the vector in (1d). Get your solution all three ways that were indicated above: by row-reducing the augmented matrix, by using the command "linsolve", and by using the inverse matrix to B .
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- 2a) Solve $Ax=v$ for x , where A and v are as indicated above. Verify, with Maple, that your solution x actually solves the equation $Ax=v$.
 - 2b) Repeat your work above in order to solve $Ax=w$, where $w=(-1,4,1)$. Explain your answer.

Part B: make a fractal

Create a document in which you create a fractal. You may choose to reproduce one of the more interesting fractals from the class notes or chapter xeroxes, or you may create your very own. Your document should explain the process you went through to create the fractal, and should include the affine mapping picture (the "L" picture), and explanations of what each affine map does geometrically. Of course you may cut and paste the various procedures which automate this process; there are links to these on our Maple page.