

## FIRST WXMAXIMA PROJECT

You each get an individual wxMaxima problem that is a function of your Student Id number. Your student ID has 7 digits. Take the last three digits and call these  $d, e, f$ .

For example, if your ID was 0023456 the three digits on the right are 456. Then  $d = 4, e = 5, f = 6$ .

The first problem will explore associativity for  $3 \times 3$  matrix multiplication.

In wxMaxima do the following:

(1) Define the matrices  $A = \begin{pmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{pmatrix}$ ,  $B = \begin{pmatrix} b_{11} & b_{12} & b_{13} \\ b_{21} & b_{22} & b_{23} \\ b_{31} & b_{32} & b_{33} \end{pmatrix}$ ,

$$C = \begin{pmatrix} c_{11} & c_{12} & c_{13} \\ c_{21} & c_{22} & c_{23} \\ c_{31} & c_{32} & c_{33} \end{pmatrix}.$$

(2) Find the matrix products  $A(BC)$  and  $(AB)C$ .

(3) Are the products you get equivalent?

For the second problem, use wxMaxima to solve the following equation for  $X$ :

$$\begin{pmatrix} 1 & 21 & 21 & 1 & 34 \\ 2 & 3 & 4 & 5 & 1 \\ 1 & 2 & 5 & 4 & 3 \\ 3 & 2 & 4 & 5 & 6 \\ 3 & 2 & 4 & 2 & 2 \end{pmatrix} X = \begin{pmatrix} d & e & f & 2 & 3 \\ 43 & 54 & 65 & 65 & 76 \\ 23 & 32 & 54 & 45 & 56 \\ 1 & 2 & 1 & 3 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{pmatrix}$$

First, how many rows and columns should  $X$  have?

Next, how do we solve a matrix equation of the form  $AX = B$ ?

For the third problem, find the inverse of the matrix on the left in the second problem by defining an appropriate augmented matrix, then using **only** the 'rowop' command.

Save your work as yourlastname.wxm. (For example, if your last name is Smith, your project should be saved as smith.wxm.) Please include comment cells with explanations throughout your project.