

# Matrices – Act 1

## Student Activity

7 8 9 10 11 12



## Addition & Subtraction

Start a new document and insert a calculator application.

The first matrix will be defined as: *mata*

It is not necessary to have 'mat' at the start of the variable name, however it will help immediately identify which of your defined variables is a matrix.

In this document a matrix is denoted as: [A].

One way to define a variable is to use " := "

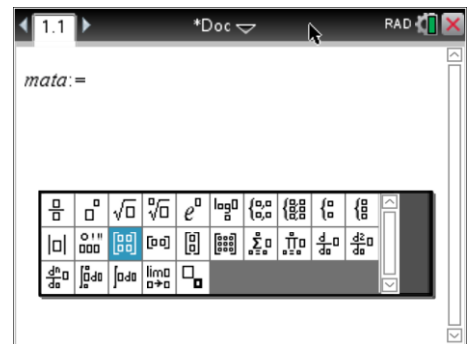
Type: *mata* :=

Use the maths template and select the 2 x 2 matrix template (shown opposite)



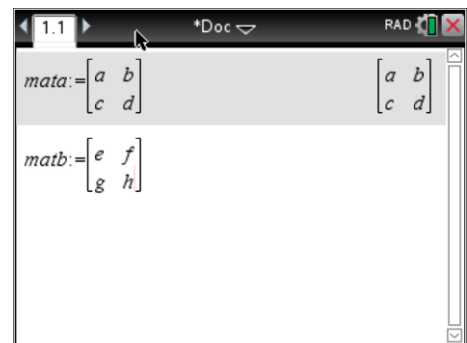
Define matrix A as: *mata* :=  $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$

Use the [TAB] key to navigate around the matrix.



Repeat the above process to create a second matrix called Matrix B

*matb* :=  $\begin{bmatrix} e & f \\ g & h \end{bmatrix}$

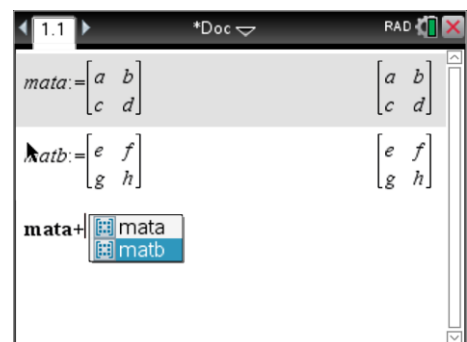


Add the two matrices together:

*mata* + *matb*

### Note:

To avoid typing the variable name again, press the variable button and select the variable name from the list.



## Questions

- Write down the rule for adding two:  $2 \times 2$  matrices.
- Use your rule to answer the following:

$$\text{a) } \begin{bmatrix} 2 & 3 \\ 4 & 1 \end{bmatrix} + \begin{bmatrix} 5 & 7 \\ 2 & 8 \end{bmatrix}$$

$$\text{b) } \begin{bmatrix} 5 & 7 \\ 2 & 8 \end{bmatrix} + \begin{bmatrix} 2 & 3 \\ 4 & 1 \end{bmatrix}$$

$$\text{c) } \begin{bmatrix} 5 & -2 \\ 1 & -3 \end{bmatrix} + \begin{bmatrix} 6 & 8 \\ 1 & 2 \end{bmatrix}$$

$$\text{d) } \begin{bmatrix} 6 & 8 \\ 1 & 2 \end{bmatrix} + \begin{bmatrix} 5 & -2 \\ 1 & -3 \end{bmatrix}$$

- Check your answers using the CAS calculator.

**Commutative Law:**

$$a + b = b + a$$

- Determine if the commutative law (above) applies to matrices.

**Associative Law:**

$$a + (b + c) = (a + b) + c$$

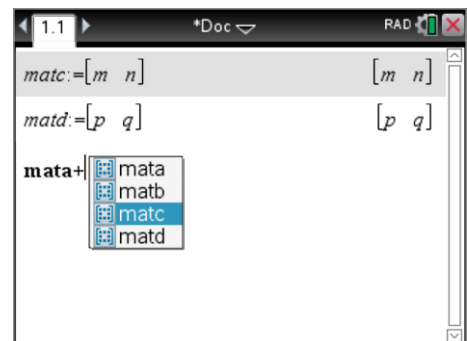
- Determine if the associative law (above) applies to matrices.
- Add  $[A]$  to itself. ie:  $\text{mata} + \text{mata}$ . Check this answer against  $2 \times [A]$ .
- Write down a general rule for  $n \times [A]$
- Explore the subtraction of matrices.  
*Use the previous questions as a guide for your explorations.*

## Dimensions

Two new matrices need to be defined:  $\text{matc}$  and  $\text{matd}$

$$\text{matc} := \begin{bmatrix} m & n \end{bmatrix}$$

$$\text{matd} := \begin{bmatrix} p \\ q \end{bmatrix}$$



- Explore the addition and subtraction of matrices with different dimensions. Record the results for each of the following:
  - $[A] + [C] =$
  - $[C] + [A] =$
  - $[A] + [D] =$
  - $[D] + [A] =$

e) Comment on your findings with regards to addition and subtraction of matrices with different dimensions.