Concept –Identity Matrices

An identity matrix is like the number one. These matrices are always square matrices with the leading diagonal all 1s and all other elements being 0.

Eg.

$$[1] = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} & \\ & \end{bmatrix} = \begin{bmatrix} & \\ & \end{bmatrix}$$

Multiplying another matrix by the identity matrix will not change the original matrix.

Concept –The determinant

The determinant of a matrix is a number which can be used to represent that matrix. To find the determinant of a 2x2 matrix use the rule:

$$A = \begin{bmatrix} a & b \\ c & d \end{bmatrix} \qquad det(A) = ad - bc$$

Eg: Find the determinant of the matrices below.

$$B = \begin{bmatrix} 2 & 5 \\ 8 & 4 \end{bmatrix} \qquad W = \begin{bmatrix} 2 & 3 \\ 4 & 6 \end{bmatrix}$$

If a matrix has a determinant of zero, then that matrix will not have an inverse.

How to – Find the determinant with CAS

1. On a  _____ page type 
2. Press  to open the templates then choose the big matrix template  then type in the number of rows and the number of columns.

Concept – Inverse of a matrix.

In our studies of matrices so far we have looked at how to add, subtract and multiply matrices.
It is not possible to divide matrices, instead, we _____.

To find the inverse of a 2x2 matrix:

$$A = \begin{bmatrix} a & b \\ c & d \end{bmatrix} \qquad A^{-1} = \frac{1}{ad - bc} \begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$$

Eg: Find the inverse of the matrices below if possible.

$$B = \begin{bmatrix} 2 & 5 \\ 8 & 4 \end{bmatrix} \qquad W = \begin{bmatrix} 2 & 3 \\ 4 & 6 \end{bmatrix}$$

How to – Find the inverse of a matrix with CAS

1. On a  _____ page press  to open the templates.

2. Choose the big matrix template  then type in the number of rows and the number of columns and fill in the matrix.
3. Move the cursor outside the right hand bracket and press ^ -1 then press enter

Worked Example

Choose a 2x2 matrix. Calculate it's determinant and inverse by hand, showing each step of the process.