$$2 \times \frac{1}{2} = 1$$

$$2 \times 2^{-1} = 1 = 2^{-1} \times 2$$

We say 2^{-1} is the INVERSE of 2 if $2 \times 2^{-1} = 1$

Recap on matrix algebra

$$A = \begin{bmatrix} 4 & 2 \\ 3 & 1 \end{bmatrix} \qquad B = \begin{bmatrix} 1 & 6 & 2 \\ 3 & 0 & 9 \end{bmatrix}$$

$$A \times B \text{ or } A.B = \begin{matrix} (4\times1+2\times3) & (4\times6+2\times0) & (4\times2+2\times9) \\ (3\times1+1\times3) & (3\times6+1\times0) & (3\times2+1\times9) \end{matrix}$$

$$= \begin{bmatrix} 10 & 24 & 26 \\ 6 & 18 & 15 \end{bmatrix}$$

We say $\underset{(2\times2)}{A} . \underset{(2\times3)}{B} = \underset{(2\times3)}{C}$

The inverse of a matrix A is A^{-1} and is such that

$$A.A^{-1} = I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} = A^{-1}.A$$

If $A = \begin{bmatrix} 4 & 2 \\ 3 & 1 \end{bmatrix}$ $\quad A^{-1} = \frac{1}{-2}\begin{bmatrix} 1 & -2 \\ -3 & 4 \end{bmatrix} = \begin{bmatrix} -1/2 & 1 \\ 3/2 & -2 \end{bmatrix}$

Prove that $A.A^{-1} = I$

$$\begin{bmatrix} 4 & 2 \\ 3 & 1 \end{bmatrix} \cdot \begin{bmatrix} -1/2 & 1 \\ 3/2 & -2 \end{bmatrix} = \begin{bmatrix} (4 \times -1/2 + 2 \times \frac{3}{2}) & (4 \times 1 + 2 \times -2) \\ (3 \times -1/2 + 1 \times 3/2) & (3 \times 1 + 1 \times -2) \end{bmatrix}$$

$$= \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \checkmark$$

In VBA matrix multiplication is carried out using

C = WorksheetFunction.MMult(A, B)

And inversion is done using:

D = WorksheetFunction.MInverse(A)