= g (Ax) =
B (Ax) = (BA) x .
The last equality follows from the above @-@ mentioned associativity of matrix multiplication .
The rank of a matrix A is the maximum number of linearly independent row vectors of the matrix , which is the same as the maximum number of linearly independent column vectors . Equivalently it is the dimension of the image of the linear map represented by A. The rank @-@ nullity theorem states that the dimension of the kernel of a matrix plus the rank equals the number of columns of the matrix .

= = Square matrix = =

A square matrix is a matrix with the same number of rows and columns . An n @-@ by @-@ n matrix is known as a square matrix of order n . Any two square matrices of the same order can be added and multiplied . The entries aii form the main diagonal of a square matrix . They lie on the imaginary line which runs from the top left corner to the bottom right corner of the matrix .

= = = Main types = = =

= = = = Diagonal and triangular matrix = = = =

If all entries of A below the main diagonal are zero , A is called an upper triangular matrix . Similarly if all entries of A above the main diagonal are zero , A is called a lower triangular matrix . If all off @-@ diagonal elements are zero , A is called a diagonal matrix .

= = = = Identity matrix = = = =

The identity matrix In of size n is the n @-@ by @-@ n matrix in which all the elements on the main diagonal are equal to 1 and all other elements are equal to 0 , e.g.
<formula>
It is a square matrix of order n , and also a special kind of diagonal matrix . It is called an identity matrix because multiplication with it leaves a matrix unchanged :