

LA - 1.5 - Scalar/Multiplication Matrices

Scalar Product – multiply a number $c \times A$

$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{bmatrix}$

$c = 2$

$2A = \begin{bmatrix} 2 & 4 \\ 6 & 8 \\ 10 & 12 \end{bmatrix}$

$cA = \begin{bmatrix} 1 \times 2 & 2 \times 2 \\ 3 \times 2 & 4 \times 2 \\ 5 \times 2 & 6 \times 2 \end{bmatrix}$
 $Ac = A2 = 2A$

Multiply $A \bullet B$

$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{bmatrix}$

$B = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$

Point to where you look. Both Hands!

*Left hand Horizontal
Right Hand Vertical!*

$\begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{bmatrix} \bullet \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} = \begin{bmatrix} 1 \times 1 + 2 \times 3 & 1 \times 2 + 2 \times 4 \\ 3 \times 1 + 4 \times 3 & 3 \times 2 + 4 \times 4 \\ 5 \times 1 + 6 \times 3 & 5 \times 2 + 6 \times 4 \end{bmatrix} = \begin{bmatrix} 7 & 10 \\ 15 & 14 \\ 23 & 34 \end{bmatrix}$

You end up with the # of rows in the first matrix and the number of columns in the second.

Coincidence it is the same type as Matrix A!

*r_1 ; all about a_{r1} times everything in b^**
 r_2 ; all about a_{r2} "
 r_3 ; all about a_{r3} "

*(If A is 1st) *Appropriately*

3 x 2
Answer

The diagram illustrates the row-by-column multiplication process. It shows five rows of matrix A and five rows of matrix B. Each row of A is multiplied by each column of B. The results are shown in a vertical column on the right, with a box labeled "Steps" next to it.