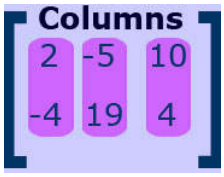
Name: _____ **Date:**_____

1 Matrices

A matrix is a two-dimensional array of numbers arranged in **rows** and **columns**.

Row is a **horizontal** line of numbers.

Column is a **vertical** line of numbers.



A matrix with ***m*** **rows** and
n **columns** has an order of *m* x *n*

$\begin{pmatrix} 1 & 2 & 3 \\ 9 & 9 & 9 \end{pmatrix}$ Is a matrix of order 2×3 . (since it has 2 rows and 3 columns)

☺Remember: **Row by Column**!

1.1 Matrix multiplication

1) **Firstly, the order of the matrices must match!**
   $m\times n$ **Matrix multiplied by** $n\times q$ **matrix will give an** $m\times q$ **matrix.**

1.1.1 Example:

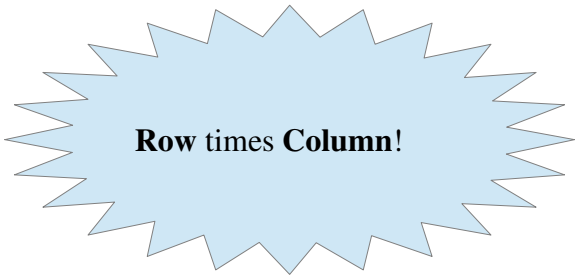
$$A=\begin{pmatrix}2 & 3 & 5\\ 7 & 9 & 1\end{pmatrix}\ ,\ B=\begin{pmatrix}1.20\\ 2.90\\ 3.10\end{pmatrix}$$

A is 2×3 matrix.

B is 3×1 matrix.

Final product AB will be a 2×1 matrix.

$$AB=\begin{pmatrix}(2)(1.20)+3(2.90)+5(3.10)\\ (7)(1.20)+(9)(2.90)+(1)(3.10)\end{pmatrix}=\begin{pmatrix}26.6\\ 37.6\end{pmatrix}$$



1.2 Important Matrices Often Tested!

1) **The Matrix consisting of 1's.** $\begin{pmatrix}1 & 1 & 1\end{pmatrix}$: Used to add up to **<u>find total</u>**.

   For example: There are 4 apples, 5 orange, 6 pears, use matrix to find total number of fruits.

$$\begin{pmatrix}1 & 1 & 1\end{pmatrix}\ \begin{pmatrix}4\\ 5\\ 6\end{pmatrix}\ =\ \begin{pmatrix}15\end{pmatrix}$$

2) **Diagonal Matrix**: Used to **<u>change each number by a certain percent</u>**.

Example: Book A costs \$10, Book B costs \$20. Book A has 20% discount, Book B has 30% discount. Use matrix to find out their final costs.

$$\begin{pmatrix}0.8 & 0\\ 0 & 0.7\end{pmatrix}\ \begin{pmatrix}10\\ 20\end{pmatrix}\ =\ \begin{pmatrix}8\\ 14\end{pmatrix}$$