**Section 8.3 🡺 Intro to Matrices & Operations w/Matrices**

* Special “Reads” from your textbook. “Add” these to ‘YOUR’ 8.3 notes🡺
* Read sec(8.2) & ***copy/paste*** the 3-D “**visual Plane**” figures of the different types of

Solutions for a 3X3 system. **[[ 5-diagrams🡪 1 sol/Infinite sol/3-ex of no sol.]]**

* Read in Sec(8.3) about 🡪 1) Properties of Matrices **[p.909]**

 2) Multiply Matrices **[p.910-911]**

 3) Who is A. Caley? **[p.909]**

* **A Matrix🡪** A rectangular array of number(s) ***[elements/entries]*** in rows ***by*** columns placed in

 **[**Brackets**]**… [ **a** ]… ***a is the entry in 1st -row – 1st-col.***

* Use a Capital letter to ‘name’ or denoted a matrix
* ‘Order’/dimension of a matrix is denoted **m x n** where **m**= # of rows by **n**= # of columns.
* An element/entry of a matrix is denoted by 🡪
* A= [ a***ij*** ] where ***a*** isthe element of matrix A in

 The ***ith*** row – ***jth*** column.

* **Square Matrix 🡪** a Matrix with the same number of rows an columns. i.e. 2X2, 3X3, etc…

EX-1) Given: A = $\left[\begin{matrix}5&-2\\-3&Π\\1&6\end{matrix}\right]$ **a)** What is the order of A? **b)** Identify a***12*** and a***31***

* **Equal Matrices🡪** **A = B** if and only if 1) the matrices have the same order rowXcol—mxn

 2) a***ij*** = b***ij*** 🡪 same position = same element.

* **Column Matrix 🡪** Matrix with ***1 column*** && Row matrix**🡪** Matrix with ***1 row***

 ***[may have 1 or multiple rows] [may have 1 or multiple columns]***

* **Scalor Multiplication 🡪** A **scalor** **‘*c*’** in advanced math or Matrices is a $R$ number used to augment an expression or a Matrix. We just multiply each entry of the matrix by the *‘scalor’*.

**ADDITION + & SUBTRACTION – of Matrices🡺 have 2-basic “Rules”**

1. Matrices to be +/- must have the **same “order”**
2. **+/-** each element in corresponding position & place result back is same position.

EX-2) Given Matrix A & B, perform the Matrix Operation(s)

A = $\left[\begin{matrix}-4&1\\3&0\end{matrix}\right]$ B = $\left[\begin{matrix}-1&-2\\8&5\end{matrix}\right]$ Find 3A + 2B

Matrix Multiplication🡺 Multiply🡪 ROW X COL. **[add the product of entries]**

RULES🡪 The “order” of the 2-matrices doesn’t matter as long as….

1. IF the **Col of the 1st Matrix = the Rows of the 2nd Matrix** , then….
2. The “order” of the product is 🡪 Row of 1st X Col of 2nd 🡪 [RxC]
3. ***Bonus***: 2 square matrices may always be multiplied.

 **MULTIPLICATION OF MATRICES IS NOT COMMUTATIVE!!** **AB ≠ BA**

 **IF AB = *I* and BA = *I,* where *I* =** $\left[\begin{matrix}1&0\\0&1\end{matrix}\right]$ **[identity matrix], then the matrices are inverses.**

EX-3) Find the product **AB,** if possible. A = $\left[\begin{matrix}2&3\\4&2\\0&1\end{matrix}\right]$ B = $\left[\begin{matrix}0&3\\-7&5\end{matrix}\right]$

 **AB =** $\left[\begin{matrix}2&3\\4&2\\0&1\end{matrix}\right]$ **∙** $\left[\begin{matrix}0&3\\-7&5\end{matrix}\right]$ = 

 3 X **2** **2** X 2

 3 X 2