Matrices Notes

Remember, Dimension stated as row x column (2 x 3, etc.)

Adding/Subtracting: $A = \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix}$ and $B = \begin{bmatrix} b_{11} & b_{12} \\ b_{21} & b_{22} \end{bmatrix}$

- Both Matrices must have same dimension.

- $A + B = \begin{bmatrix} a_{11} + b_{11} & a_{12} + b_{12} \\ a_{21} + b_{21} & a_{22} + b_{22} \end{bmatrix}$

Multiplying by Scalar and Multiple Matrices:

- If multiplying two matrices, the number of columns of *A* must be equal to the number of rows of *B*.
- $cA = \begin{bmatrix} ca_{11} & ca_{12} \\ ca_{21} & ca_{22} \end{bmatrix}$
- $AB = \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix} \begin{bmatrix} b_{11} & b_{12} \\ b_{21} & b_{22} \end{bmatrix} = \begin{bmatrix} a_{11}b_{11} + a_{12}b_{21} & a_{11}b_{12} + a_{12}b_{22} \\ a_{21}b_{11} + a_{22}b_{21} & a_{21}b_{12} + a_{22}b_{22} \end{bmatrix}$

Examples

- Given $A = \begin{bmatrix} -9 & -3 \\ 9 & 0 \\ 4 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} -7 & -2 \\ 4 & 6 \\ 9 & -3 \end{bmatrix}$, what is *B* + *A*?

- The tables show the number of hours two students spent on homework in Math and Science classes. Which student spent more hours on homework in the Spring Semester?

Fall Semester Hours

	Math	Science
Student A	166	133
Student B	140	120

Fall & Spring Semester Hours

	Math	Science
Student A	300	227
Student B	282	231

- What is the sum of matrices [-6 7 0] and [6 -7 0]?

- What values of *x* and *y* make the equation true?

$$\begin{bmatrix} 8 & -2x \\ 3 & 7 \end{bmatrix} + \begin{bmatrix} 0 & -7 \\ 8 & 2 \end{bmatrix} = \begin{bmatrix} 8 & -5 \\ 11 & 3y \end{bmatrix}$$

- If $A = \begin{bmatrix} 4 & -3 \\ 1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 7 & 3 \\ -2 & -4 \end{bmatrix}$, what is $3A - B$?

- What is the solution of $-2\begin{bmatrix} 2 & 3 \\ 1 & 0 \end{bmatrix} + 2T = \begin{bmatrix} -2 & -14 \\ -2 & 6 \end{bmatrix}$?

- If $V = \begin{bmatrix} -4 & 0 \\ 3 & 5 \end{bmatrix}$ and $W = \begin{bmatrix} 2 & 2 \\ -1 & 3 \end{bmatrix}$, What is VW?

- A library has three printers. The cost of printing from printer A is 3 cents per page, from printer B is 6 cents per page, and from printer C is 14 cents per page. During October and November, the librarian recorded the number of pages printed on each printer, as shown below. Using matrix multiplication, what was the monthly cost of operating the printers from October and November?

	October	November
Printer A	584	598
Printer B	549	610
Printer C	159	185