The Matrix

What is a matrix?

A Matrix is an array of numbers in Rows and Columns.

$$\begin{bmatrix} 3 & -2 \\ 4 & 0 \\ -1 & 5 \end{bmatrix}$$

This is a 3x2 matrix containing 6 elements.

Vocabulary

- <u>Dimensions of a Matrix</u> - given by #rows x # columns

- <u>Elements/Entries</u> - the numbers in a matrix

- <u>Equal Matrices</u> - two matrices are equal if their dimensions are the same and their corresponding entries are equal. $\begin{bmatrix} -1 & 1/2 \\ |-2| & 0 \end{bmatrix} = \begin{bmatrix} -1 & .5 \\ 2 & 0 \end{bmatrix}$

Vocabulary

- <u>Row Matrix</u> - a matrix with only one row $\begin{bmatrix} -1 & 4 & 0 \end{bmatrix}$

- <u>Column Matrix</u> - a matrix with only one column $\begin{bmatrix} 3 \\ -2 \\ 1 \\ 5 \end{bmatrix}$

- <u>Square Matrix</u> - a matrix with the same number of rows as columns $\begin{bmatrix} 5 & 0 \\ -3 & -4 \end{bmatrix}$

Scalar Multiplication

To multiply a matrix by a scalar, multiply each entry in the matrix by the scalar.

Ex. $2\begin{bmatrix} 5 & 0 \\ -3 & -4 \end{bmatrix}$

Solving Matrix Equations

If two matrices are equal, their corresponding entries are equal.

Ex. $\begin{bmatrix} x & 1 \\ -3 & y \end{bmatrix} = \begin{bmatrix} 5 & 1 \\ -3 & -6 \end{bmatrix}$

Adding Matrices

To add matrices, add corresponding entries.

Ex. $\begin{bmatrix} 3 & -2 \\ 4 & 0 \\ -1 & 5 \end{bmatrix} + \begin{bmatrix} 1 & 4 \\ -7 & 3 \\ -5 & 1 \end{bmatrix}$

Subtracting Matrices

To subtract matrices, subtract corresponding entries.

Ex. $\begin{bmatrix} 3 & -2 \\ 4 & 0 \\ -1 & 5 \end{bmatrix} - \begin{bmatrix} 1 & 4 \\ -7 & 3 \\ -5 & 1 \end{bmatrix}$