

## Section 6.4 -- BASIC MATRIX OPERATIONS

A matrix with  $m$  rows and  $n$  columns has dimensions or size  $m \times n$ .

*Example 1:*

Find the size of each matrix:

a)  $\begin{bmatrix} 6 & 5 \\ 3 & 4 \\ 5 & -1 \end{bmatrix}$

b)  $\begin{bmatrix} 5 & 8 & 9 \\ 0 & 5 & -3 \\ -4 & 0 & 5 \end{bmatrix}$

c)  $[1 \quad 6 \quad 5 \quad -2 \quad 5]$

A matrix with only one row is called a row matrix while a matrix with only one column is called a column matrix. A matrix with the same number of rows as columns is called a square matrix.

### Adding and Subtracting Matrices:

Matrices must have the same size in order to add or subtract them. To add or subtract matrices, you simply add or subtract the corresponding elements in each matrix.

*Example 2:*

a)  $\begin{bmatrix} 5 & -6 \\ 8 & 9 \end{bmatrix} + \begin{bmatrix} -4 & 6 \\ 8 & -3 \end{bmatrix}$

b)  $\begin{bmatrix} 1 & 2 & 3 \\ 0 & -1 & 5 \end{bmatrix} - \begin{bmatrix} -2 & 3 & 0 \\ 1 & -7 & 2 \end{bmatrix}$

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

The Additive Inverse of a Matrix contains elements that are the opposite of each element in the original matrix.

*Example 3:*

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

Additive Inverse would be:

A Zero Matrix is a matrix in which all elements are zero.

*Example 4:*

$$\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$$

### Scalar Product of a Matrix:

Multiply each element of the matrix by the scalar.

*Example 5:*

$$-3 \begin{bmatrix} 2 & -5 \\ 1 & 7 \end{bmatrix}$$

### Assessment:

Let  $A = \begin{bmatrix} -2 & 4 \\ 0 & 3 \end{bmatrix}$  and  $B = \begin{bmatrix} -6 & 2 \\ 4 & 0 \end{bmatrix}$ . Find each of the following:

1)  $2A$

2)  $-4B$

3)  $-4A + 5B$