9.1 – Matrices

I. Terms and Definitions

A. A matrix is a rectangular array of numbers enclosed by brackets.

Examples of matrices: $\begin{bmatrix} 2 & 0 \\ 7 & 15 \\ -3 & 19 \end{bmatrix}$ $\begin{bmatrix} 3 & 0 & 9 \\ 0 & -2 & 0 \end{bmatrix}$ $\begin{bmatrix} -3 & 3 \\ 8 & -1 \end{bmatrix}$

B. The numbers in a matrix are called the elements of the matrix. The number of rows (horizontal) and the number of columns (vertical) determine the dimensions of the matrix. The dimensions of a matrix are always written rows X columns. (by)

Examples: What are the dimensions of the following matrices?

1. $\begin{bmatrix} 2 & 0 \\ 7 & 15 \\ -3 & 19 \end{bmatrix}$ Rows Columns 3 X 2 (by)

2. $\begin{bmatrix} 3 & 0 & 9 \\ 0 & -2 & 0 \end{bmatrix}$ 2 X 3

C. Two matrices are equal only if they have the same dimensions and the elements in all corresponding positions are equal.

Examples: Find the value of each variable.

1. $\begin{bmatrix} x & 3 \\ y & z \end{bmatrix} = \begin{bmatrix} -9 & 3 \\ -2 & -6 \end{bmatrix}$

$x = -9$
$y = -2$
$z = -6$

2. $\begin{bmatrix} x+y & 3 \\ x-y & 5 \end{bmatrix} = \begin{bmatrix} 7 & 3 \\ 1 & 5 \end{bmatrix}$

$x+y=7$
$x-y=1$
$2x=8$
$x=4$

$4+y=7$
$y=3$