4.1 Introduction To Matrices

Objective: Solve data in matrices.
Solve equations involving matrices

Matrix: a rectangular array of variables or constants in horizontal rows and vertical columns.

Ex) $\begin{bmatrix} 2 & 4 \\ 7 & 6 \\ 9 & -3 \end{bmatrix}$ 3 x 2

* Each #/value is an element
* Size: rows x columns ie: 3x2
* Square matrix
  - 3x3, 4x4, 5x5
* Zero matrix all entries are zero

Ex1) State the dimension of each

A) $\begin{bmatrix} 1 & 2 & 3 \end{bmatrix}$ 1 x 3

B) $\begin{bmatrix} 5 & 4 & 3 \\ -6 & 2 & 1 \end{bmatrix}$ 2 x 3

C) $\begin{bmatrix} 4 \\ 1 \\ -3 \end{bmatrix}$ 3 x 1

Ex2) Solve each Equation

A) $\begin{bmatrix} x+4 \\ 2y \end{bmatrix} = \begin{bmatrix} 9 \\ 12 \end{bmatrix}$ (2x1 = 2x1)

$x+4=9$ | $2y=12$

$x=5$ | $y=6$

B) $\begin{bmatrix} y \\ 3x \end{bmatrix} = \begin{bmatrix} 6-2x \\ 31+4y \end{bmatrix}$ (2x1)

$y=6-2x$

$3x=31+4y$

$3x=31+4(6-2x)$

$3x=31+24-8x$

$3x=55-8x$

$+8x \quad +8x$

$11x=55$

$\frac{11x}{11}=\frac{55}{11}$

$x=5$

$y=6-2(5)$

$y=6-10$

$y=-4$

C) $\begin{bmatrix} 9 & 13 \end{bmatrix} = \begin{bmatrix} x+2y & 4x+1 \end{bmatrix}$ (1x2 = 1x2)

$9=x+2y$

$13=4x+1$

$-1 \quad -1$

$12=4x$

$\frac{12}{4}=\frac{4x}{4}$

$3=x$

$9=3+2y$

$-3 \quad -3$

$6=2y$

$\frac{6}{2}=\frac{2y}{2}$

$3=y$

D) $\begin{bmatrix} 4x-3 & 3y \\ 7 & 13 \end{bmatrix} = \begin{bmatrix} 9 & -15 \\ 7 & 2z+1 \end{bmatrix}$

$4x-3=9$

$+3 \quad +3$

$4x=12$

$\frac{4x}{4}=\frac{12}{4}$

$x=3$

$7=7$

$\frac{3y}{3}=\frac{-15}{3}$

$y=-5$

$13=2z+1$

$-1 \quad -1$

$12=2z$

$\frac{12}{2}=\frac{2z}{2}$

$6=z$