

Day 6 - Solving Systems Using Matrices

$$\frac{2x}{2} = \frac{10}{2}$$

$$x = 5$$

$$\left(\frac{1}{2}\right) \cdot (2x) = 10 \cdot \frac{1}{2}$$

$$1x = 5$$

$$[A][X] = [B]$$

$$\cancel{A^{-1} \cdot A} X = A^{-1} \cdot B$$

$$X = A^{-1} \cdot B \Rightarrow \text{calculator}$$

Ex 1: Solve $1x - 2y = 5$
 $2x - 3y = 10$

Matrix Equation:

$$\begin{bmatrix} 1 & -2 \\ 2 & -3 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 5 \\ 10 \end{bmatrix}$$

A coefficient matrix X variables B constant

$$AX = B$$
$$A^{-1} \cdot AX = A^{-1} \cdot B$$
$$X = A^{-1} \cdot B$$

~~$B \cdot A^{-1}$~~
 $2x \oplus 2x \cdot 1$
 ~~$-2x \oplus 2x \cdot 2$~~

$$\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 5 \\ 0 \end{bmatrix} \quad \begin{bmatrix} x=5 \\ y=0 \end{bmatrix}$$

Ex 2: Solve $x + y + z = -1$
 $3x + 5y + 4z = 2$
 $3x + 6y + 5z = 0$

$$\begin{bmatrix} 1 & 1 & 1 \\ 3 & 5 & 4 \\ 3 & 6 & 5 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} -1 \\ 2 \\ 0 \end{bmatrix}$$

$$x = 1$$
$$y = 7$$
$$z = -9$$