

Monday, October 24, 2016 - Late Start

Opener - Plickers

HW Check and Questions

7.3 - Solving Systems using Inverse Matrices

HW: From Thursday: 7.3 Day 1 HW

p. 553 #45-50, 51-54, **SKIP 87**



7.3 Solving Systems Using Matrices

Ex 1

$$\begin{aligned} 3x - 2y &= 0 \\ -x + y &= 5 \end{aligned}$$

Step 1: Write as a matrix equation:

$$A = \begin{bmatrix} 3 & -2 \\ -1 & 1 \end{bmatrix} \quad X = \begin{bmatrix} x \\ y \end{bmatrix} \quad B = \begin{bmatrix} 0 \\ 5 \end{bmatrix}$$

$$A \cdot X = B$$

Step 2: Solve for X \Rightarrow $X = A^{-1} \cdot B$

$$A^{-1} = \frac{1}{ad-bc} \begin{bmatrix} d & -b \\ -c & a \end{bmatrix} = \frac{1}{1} \begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix} = \begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix}$$

$$X = A^{-1} \cdot B = \begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix} \cdot \begin{bmatrix} 0 \\ 5 \end{bmatrix} = \begin{bmatrix} 10 \\ 15 \end{bmatrix}$$

So $x=10$ and $y=15$

Ex. 2 in calculator:

$$\begin{aligned} 2x - y + z &= -6 \\ x + 2y - 3z &= 9 \\ 3x - 2y + z &= -3 \end{aligned}$$

Step 1 Matrix Equation $A \cdot X = B$

$$A = \begin{bmatrix} 2 & -1 & 1 \\ 1 & 2 & -3 \\ 3 & -2 & 1 \end{bmatrix} \quad X = \begin{bmatrix} x \\ y \\ z \end{bmatrix} \quad B = \begin{bmatrix} -6 \\ 9 \\ -3 \end{bmatrix}$$

$$r \cdot \begin{bmatrix} 1 & 2 & -3 \\ 3 & -2 & 1 \end{bmatrix} \begin{bmatrix} y \\ z \end{bmatrix} = \begin{bmatrix} 9 \\ -3 \end{bmatrix}$$

Step 2 In calculator, $X = A^{-1}B$

$$X = \begin{bmatrix} -2 \\ -5 \\ -7 \end{bmatrix} \quad \text{So } \begin{aligned} x &= -2 \\ y &= -5 \\ z &= -7 \end{aligned}$$