Accel Precalc Notes: Solving Systems of Equations Name _____
Unit 3: Matrices with Matrices
Lesson 8

EQ:

❖ Get out and cut on your graphing calculator.

❖ Use your graphing calculator to perform the following operation in the given matrices.

$$A=\begin{bmatrix} 5 & 7 & -3 & 0 \\ -2 & 1 & 8 & 11 \end{bmatrix} \quad B=\begin{bmatrix} 8 & -5 & 2 & -1 \\ 4 & -2 & 0 & -5 \\ 3 & 5 & 7 & -6 \end{bmatrix} \quad C=\begin{bmatrix} 7 \\ 2 \\ 6 \end{bmatrix} \quad D=\begin{bmatrix} 3 & -1 & 9 & 8 \\ 6 & 2 & 0 & 5 \end{bmatrix} \quad E=\begin{bmatrix} -3 & 8 & -5 \end{bmatrix}$$

$$F=\begin{bmatrix} -4 & 8 \\ 0 & 9 \\ 5 & -3 \\ 1 & 2 \end{bmatrix}$$

a) A + D b) CB c) BD d) FD

A system of equations may be represented as a matrix equation. For example, the system of equations $\begin{cases} 3x-5y=1 \\ 2x+y=-2 \end{cases}$ may be represented by the matrix equation

Ex. 1 Write the matrix equation that represents the system: $\begin{cases} x+y=8 \\ 2x+y=1 \end{cases}$

Ex. 2 Write the matrix equation that represents the system: $\begin{cases} x+3y=13 \\ 2x-y=-9 \end{cases}$

Ex. 3 Write the system of equations represented by the matrix equation $\begin{bmatrix} -1 & 5 & 2 \\ 1 & 2 & 0 \\ 4 & 0 & -3 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix}=\begin{bmatrix} -5 \\ -4 \\ 10 \end{bmatrix}$

- A matrix equation is in the form **AX = B**, where **A** is the _____ matrix, X is the _____ matrix, and B is the _____ matrix.

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

A = *B =* *X =*

Ex. 4 Solve each system using a matrix equation. SET UP THE CORRECT MATRIX EQUATION FOR EACH PROBLEM.

a) $2x+3y=2$
$4x-9y=-1$

b) $9x-7y=5$
$10x+3y=-16$

c) $x-2y+3z=3$
$2x+y+5z=8$
$3x-y-3z=-22$

d) $5x-4y+3z=15$
$6x+2y+9z=13$
$7x+6y-6z=6$

Ex. 5 **Application Problem**

A financial manager wants to invest $50,000 for a client by putting some of the money in a low-risk investment that earns 5% per year and some of the money in a high-risk investment that earns 14% per year. How much money should she invest at each interest rate to earn $5000 in interest per year?

Ex. 6 Solve the system using a **matrix equation**. $\begin{cases} -3x+4y=3 \\ -6x+8y=18 \end{cases}$

Ex. 7 Solve the system using a **matrix equation**. $\begin{cases} 9x-3y=27 \\ -6x+2y=-18 \end{cases}$

- Assignment: Textbook p. 589 #51 – 63 odd Use the determinant and/or matrices to solve each system. **If there is not a unique solution classify the system as consistent dependent, or inconsistent.**