Name: ______________ Math 40, Section _____
HW04 - Matrix Operations and Matrix Inverses February 9, 2017

Section 3.2 Numbers; 4, 22
Section 3.3 Numbers; 13a, 13b, 22, 47

3.2.4 *Given A and B solve the equation,* $2(A - B + X) = 3(X - A)$ *, forX*

$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \text{ and } B = \begin{bmatrix} -1 & 0 \\ 1 & 1 \end{bmatrix}$$

$\blacksquare$

3.2.22 *Prove that, for square matrices A and B , $AB = BA$ if and only if $(A - B)(A + B) = A^2 - B^2$.*

$\blacksquare$

3.3.13

$$Let A = \begin{bmatrix} 1 & 2 \\ 2 & 6 \end{bmatrix}, \mathbf{b}_1 = \begin{bmatrix} 3 \\ 5 \end{bmatrix}, \mathbf{b}_2 = \begin{bmatrix} -1 \\ 2 \end{bmatrix} \mathbf{b}_3 = \begin{bmatrix} 2 \\ 0 \end{bmatrix}$$

a. *Find A^{-1} and use it to solve the three systems $Ax = \boldsymbol{b}_1$, $Ax = \boldsymbol{b}_2$, and $Ax = \boldsymbol{b}_3$.*

b *Solve all three systems at the same time by row reducing the augmented matrix $[A|\boldsymbol{b}_1\boldsymbol{b}_2\boldsymbol{b}_3]$ using Gauss-Jordan elminiation.*

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3.3.22 *Solve the given matrix equation for X. Simplify your answers as much possible. (In the words of Albert Einstein, "Everything should be made as simple as possible, but not simpler") Assume that all matricies are invertible*

$$(A^{-1}X)^{-1} = A(B^{-2}A)^{-1}$$

3.3.47 *Prove that if A and B are square matricies and AB is invertible, then both A and B are invertible.*