Name:_____

MA 2080: Worksheet 3

1. Write as an augmented matrix, and solve via row reduction (put into RREF).

$$\begin{cases} x & +y & = 0 \\ 3x & & = 9 \end{cases}$$

2. Write as an augmented matrix, and solve via row reduction (put into RREF).

$$\begin{cases} x & +y & +z & = 0 \\ 3x & & -z & = 7 \\ x & +2y & & = 7 \end{cases}$$

3. Let

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

compute the following.

(a) AB

(b) BA

(c) $3C - BA$

(d) C^2

(e) C^{-1}

(f) $(I - C)^{-1}$

4. Write the linear system below as a matrix multiplication problem as $A\mathbf{X} = \mathbf{b}$.

$$\begin{cases} x & +y & = 0 \\ 3x & +y = 7 & \end{cases}$$

5. For the matrix A in Problem 4. ind A and compute $A^{-1}\mathbf{b}$. What is the solution to Problem 4?

6. Leontief Input output matrices $X = (I - M)^{-1}D$

   From our textbook

   An economy is based on two industrial sectors, coal and steel. Production of a dollar worth of coal requires an input of \$0.10 from the coal sector and \$0.20 from the steel sector. Production of a dollar worth of steel requires an input of \$0.20 from the coal sector and \$0.40 from the steel sector. Find the output for each sector that is needed to satisfy a final demand of \$20 billion for coal and \$10 billion for steel.