Math 196-47, Mr. Church, Homework 2
Due at the beginning of class on Monday, April 13.
Please staple your homework.

As mentioned in class, you must show all your work.

1. Problem 1.3.4.

2. Problem 3.1.8.

3. For each of the following matrices, use Gauss-Jordan elimination to put it into reduced row-echelon form.

    a) $\begin{bmatrix} 1 & 3 & 1 \\ 2 & 0 & 4 \\ -1 & -3 & -3 \end{bmatrix}$

    b) $\begin{bmatrix} 1 & 0 & 3 & 1 & 2 \\ 1 & 4 & 2 & 1 & 5 \\ 3 & 4 & 8 & 1 & 2 \end{bmatrix}$

4. For each system of equations, use Gauss-Jordan elimination to simplify the system, then give the solution set. (Note that the variables are not aligned nicely, due to technical limitations.)

    a) $\begin{aligned} x && -z && &= 1 \\ y &+2z &-w &= 3 \\ x +2y &+3z &-w &= 7 \end{aligned}$

    b) $\begin{aligned} x &-y &+z && &= 0 \\ &y && +w &= 0 \\ 3x &-2y &+3z &+w &= 0 \\ &-y && -w &= 0 \end{aligned}$

5. Consider the following matrices:

    $$M = \begin{bmatrix} 2 & 1 \\ 1 & 1 \end{bmatrix}, \qquad N = \begin{bmatrix} 3 & 0 & -1 \\ 2 & 1 & 1 \\ -1 & 2 & 0 \end{bmatrix}, \qquad P = \begin{bmatrix} -2 & 3 \\ -2 & 1 \\ 0 & 0 \end{bmatrix}$$

    $$Q = \begin{bmatrix} 1 & -3 \\ 4 & 2 \end{bmatrix}, \qquad R = \begin{bmatrix} 1 & 0 & 2 \\ -3 & 0 & 3 \\ 2 & 1 & 0 \\ 5 & 0 & 1 \end{bmatrix}, \qquad S = \begin{bmatrix} 3 & -2 & 7 \end{bmatrix}$$

    Compute each of the following matrices, showing all your work. If the required operation does not make sense, write "not defined" and explain why (no more than one sentence).

    (a) $M + N$

    (b) MQ

    (c) QM

    (d) PR

    (e) RP

(f) $M + 4Q$

(g) NS

(h) Q^3

(i) MP

(j) PM

(k) $PM - P$

(l) $PQ + M$

(m) $Q + \pi M$