Quiz 19

April 13, 2016

1. Write the augmented matrix for the following system of equations:

$$\begin{array}{rrrcr} -2x & +7y & -z & = & -8 \\ 15x & -7y & & = & 10 \\ & y & +2z & = & 0 \end{array} \longrightarrow \left[\begin{array}{ccc|c} -2 & 7 & -1 & -8 \\ 15 & -7 & 0 & 10 \\ 0 & 1 & 2 & 0 \end{array}\right]$$

2. Use Gauss-Jordan elimination to write the matrix

$$\left[\begin{array}{cc|c} 5 & 0 & 30 \\ -1 & 4 & 10 \end{array}\right]$$

in reduced row echelon form. Write which row operation you are doing at each step.

Method 1:

$\frac{1}{5}R_1 \longrightarrow \left[\begin{array}{cc|c} 1 & 0 & 6 \\ -1 & 4 & 10 \end{array}\right]$

$R_1+R_2 \to R_2 \longrightarrow \left[\begin{array}{cc|c} 1 & 0 & 6 \\ 0 & 4 & 16 \end{array}\right]$

$\frac{1}{4}R_2 \longrightarrow \left[\begin{array}{cc|c} 1 & 0 & 6 \\ 0 & 1 & 4 \end{array}\right]$

Check: $\begin{cases} 5(6)+0(4)=30 \\ -1(6)+4(4)=10 \end{cases}$ ✓

Method 2:

$R_1 \leftrightarrow R_2 \longrightarrow \left[\begin{array}{cc|c} -1 & 4 & 10 \\ 5 & 0 & 30 \end{array}\right]$

$5R_1+R_2 \to R_2 \longrightarrow \left[\begin{array}{cc|c} -1 & 4 & 10 \\ 0 & 20 & 80 \end{array}\right]$

$\frac{1}{20}R_2 \longrightarrow \left[\begin{array}{cc|c} -1 & 4 & 10 \\ 0 & 1 & 4 \end{array}\right]$

$-4R_2+R_1 \to R_1 \longrightarrow \left[\begin{array}{cc|c} -1 & 0 & -6 \\ 0 & 1 & 4 \end{array}\right]$

$-R_1 \longrightarrow \left[\begin{array}{cc|c} 1 & 0 & 6 \\ 0 & 1 & 4 \end{array}\right]$