

Worksheet  
9/26/2018

1. Indicate if each of the following *augmented* matrices is in row echelon form (write R), reduced row echelon form (write RR), or none of these (write N). If you write RR, circle all *nonpivot* columns (if any), and write the number of solutions (0, 1 or  $\infty$ ).

(a)

$$\left[ \begin{array}{ccc|c} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & 3 \end{array} \right]$$

(b)

$$\left[ \begin{array}{ccc|c} 1 & 0 & 0 & -1 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 0 & 1 \end{array} \right]$$

(c)

$$\left[ \begin{array}{ccc|c} 1 & 0 & 0 & 2 \\ 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 0 \end{array} \right]$$

(d)

$$\left[ \begin{array}{ccc|c} 1 & 0 & 2 & 1 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & 0 \end{array} \right]$$

(e)

$$\left[ \begin{array}{ccc|c} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{array} \right]$$

(f)

$$\left[ \begin{array}{ccc|c} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{array} \right]$$

(g)

$$\left[ \begin{array}{cccc|c} 1 & 2 & -1 & 2 & 1 \\ 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 0 & 0 & 0 \end{array} \right]$$

(h)

$$\left[ \begin{array}{cccc|c} 1 & 2 & 0 & 3 & 2 \\ 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 0 & 0 & 0 \end{array} \right]$$

(i)

$$\left[ \begin{array}{ccc|c} 1 & 2 & 0 & 3 \end{array} \right]$$

2. Go back to Exercise 1, solve all consistent systems (i.e. systems that have at least one solution).

3. Check the validity of the following statement. If something is wrong, give a counterexample.

*In a system of linear equations, if there are more unknowns than equations then the system has infinitely many solutions. If there are more equations than unknowns then the system has no solutions.*