

Name: _____

Recitation Section: _____

Math 1553 Quiz 2: Section 1.2 (10 points, 10 minutes)

Solutions

1. (1 point each) In each case, determine whether the given augmented matrix is in reduced row echelon form. Circle YES if it is in RREF; circle NO if it is not in RREF.

Solution. We got practice with this on two worksheets.

a) $\left(\begin{array}{ccc|c} 1 & 3 & 0 & 2 \\ 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 0 \end{array}\right)$ YES NO

b) $(0 \ 0 \ 0 \ | \ 1)$ YES NO

2. (1 point each) Fill in the blank. For each matrix, consider the corresponding system of linear equations and write how many free variables there are for the solution set. If there are no free variables, write 0 as your answer.

Solution. This is just like #3 on the 1.2 Webwork. We mark the pivots in red. The free variables are those that do *not* correspond to pivot columns.

(a) $\left(\begin{array}{cc|c} 1 & 0 & -1 \\ 0 & 1 & 2 \\ 0 & 0 & 0 \end{array}\right)$

There are 0 free variables.

(b) $\left(\begin{array}{cccc|c} 1 & 2 & 0 & 8 & 1 \\ 0 & 0 & 1 & 0 & 1 \end{array}\right)$

There are 2 free variables.

3. (6 points) Find all values of h (if there are any) that make the following system consistent.

$$\begin{aligned}2x - y &= 3 \\4x + hy &= h.\end{aligned}$$

Show your work! If you write the correct answer without sufficient work, you will receive little or no credit.

Solution. This is very similar to #8 on the 1.2 Webwork. Here, we only have to solve for h , whereas on the Webwork we had to solve for h and k .

$$\left(\begin{array}{cc|c} 2 & -1 & 3 \\ 4 & h & h \end{array} \right) \xrightarrow{R_2=R_2-2R_1} \left(\begin{array}{cc|c} 2 & -1 & 3 \\ 0 & h+2 & h-6 \end{array} \right).$$

If $h+2=0$ (so $h=-2$) then the second line is $0=-8$ so the system is inconsistent.

If $\boxed{h \neq -2}$, then the second column will have a pivot (the first column is also clearly a pivot column), so the matrix will have a pivot in every column except the rightmost column and the system will be consistent.