Name:_____ Recitation Section:_____

Math 1553 Quiz 1, Spring 2019 (10 points, 10 minutes)

Solutions

Show your work on problem 4 or you may receive little or no credit. You do not need to show work or justify your answers on problems 1 through 3.

1. (1 point) Write one point in $\mathbf{R}^5$.
Many answers possible. For example, $(1,-4,0,2,0)$ or even $(0,0,0,0,0)$.

2. (1 point) Is the equation $x-y+2\tan(z)=17$ a linear equation in x, y, and z?
Circle your answer: LINEAR NOT LINEAR

3. (3 points) Write a system of two linear equations in two variables that has exactly one solution. You do not need to justify your answer.

Many answers possible. For example,

$$x+y=5$$
$$x-y=2.$$

4. (5 points) Find all values of h (if there are any) so that the system of linear equations given below has no solution.

$$x+y=1$$
$$3x-hy=2.$$

We do one row-replacement.

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

If $-h-3=0$, then the system is inconsistent since the second row is $0=-1$, so the system is inconsistent if $\boxed{\text{h = -3}}$. (if $h\neq -3$ we can solve for y in the second equation and back-substitute, so then it will be a consistent system)

Alternatively, we see these lines will be parallel precisely when the second line's left side is a scalar multiple of the first line's left side (the x term necessitates it is a factor of 3). This means $-h=1\cdot 3$, so $h=-3$. When $h=-3$ the system is

$$x+y=1$$
$$3x+3y=2$$

which are parallel non-identical lines.