MATH 124 QUIZ 1 SEPTEMBER 2 2016

Name:

Problem 1: *For which values of k are there no solutions, infinitely many solutions, or a unique solution to this system?*

$$\begin{aligned} x - y &= 1 \\ 3x - 3y &= k \end{aligned}$$

Solution: We put the system in echelon form by subtracting 3 times the first row from the second row:

$$\begin{aligned} x - y &= 1 \\ 0 &= k - 3. \end{aligned}$$

Thinking about the different values that k can take, we see that if $k = 3$, then the last equation becomes $0 = 0$, which is **not** a contradiction. In this case, the variable y is not the leading variable of any equation, and therefore there are infinitely many solutions.

However, if $k \neq 3$, then we get the contradiction $0 = k - 3$, and therefore there is no solution.

There is no value of k for which this system has a unique solution.