Dawson College: Fall 2019: Linear Algebra (Science): 201-NYC-05-S5: **Quiz 2** name: ________________________

No books, watches, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work.

Question 2.[1] *(6 marks)* Consider the following system:

$$\begin{array}{rcrcrcr} 2x & + & 3y & + & 4z & = & 3 \\ 2x & + & (h+1)y & + & 6z & = & 4 \\ 4x & + & 6y & + & (h-4)z & = & k-1 \end{array}$$

Find all value(s) of h and k, if possible, such that the system has: a unique solution, infinitely many solutions, no solution. *Be very clear about your combinations of h and k in each case and justify!*

Question 2. *(2 marks)* Discuss the relative positions of the lines $ax + by = 0$, $cx + dy = 0$, and $ex + fy = 0$ when the system composed of the three lines has only the trivial solution and when it has nontrivial solutions.

Question 3. Determine whether the following statements are true or false. If the statement is false provide a counterexample. If the statement is true provide a proof of the statement.

a. *(2 marks)* If an elementary row operation is applied to a matrix that is in row echelon form, the resulting matrix will still be in row echelon form.

b. *(2 marks)* Every matrix has a unique row echelon form.

c. *(2 marks)* If a linear system has more unknowns than equations, then it must have infinitely many solutions.

[1] From a previous John Abbott final examination