

## Quiz 1

This quiz is graded out of 12 marks. 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. If you need more space for your answer use the back of the page.

Question 1. §1.1 TF Determine whether the statement is true or false, and justify your answer.

c. (3 marks) The linear system  $\begin{cases} x - y = 3 \\ 2x - 2y = k \end{cases}$  cannot have a unique solution, regardless of the value of  $k$ .

True,  
 If  $k=6$  then <sup>the</sup> two lines are identical, hence  $\infty$  many solutions.  
 If  $k \neq 6$  then the two lines are parallel with different intercept, hence no point in common (no solution).

e. (3 marks) If the number of equations in a linear system exceeds the number of unknowns, then the system must be inconsistent.

False  
 $\begin{matrix} x = 1 \\ 2x = 2 \end{matrix}$  has one variable, 2 equations and is consistent.  
 Has unique solution  $x=1$ .

f. (3 marks) If each equation in a consistent linear system is multiplied through by a constant  $c$ , then all solutions to the new system can be obtained by multiplying solutions from the original system by  $c$ .

False,  
 $\begin{matrix} x + y = 2 \\ x - y = 0 \end{matrix}$  has  $(x, y) = (1, 1)$  as a solution. Then if  $c=2$   
 and the system is multiplied by  $c$ , we obtain  $\begin{matrix} 2x + 2y = 4 \\ 2x - 2y = 0 \end{matrix}$   
 and the statement states that  $(x, y) = (c(1), c(1)) = (2, 2)$  is a solution of the new system. But  $(2, 2)$  does not satisfy  $\ast$ .

h. (3 marks) The linear system with corresponding augmented matrix  $\begin{bmatrix} 2 & -1 & 4 \\ 0 & 0 & -1 \end{bmatrix}$  is consistent.

False,  
 $0x + 0y = -1$  from the last row of the augmented matrix has no  $x$  &  $y$  that can satisfy it since they are multiplied by 0.