## Date: 09/02/2021

## M20580 L.A. and D.E. Tutorial Quiz 1

1. For the following questions, consider the augmented matrix:

Γ	1	2	-5	-3]
L	0	1	-1	-7

- (a) Is the matrix in reduced row echelon form?If yes, why?If no, what is the reduced row echelon form?
- (b) Find all solutions.

**Solution:** The matrix is not in reduced row echelon form since there is a nonzero entry in the second pivot column.

The reduced row echelon form is

 $\left[ \begin{array}{rrrr|rrr} 1 & 0 & -3 & | & 11 \\ 0 & 1 & -1 & | & -7 \end{array} \right].$ 

From this, we see that  $x_1 = 11 + 3x_3$ ,  $x_2 = -7 + x_3$ . Evidently,  $x_3$  is a free variable, so if we set  $t := x_3$ , the final solution can be written in the form

$$\begin{bmatrix} x_1 \\ x_2 \\ x_2 \end{bmatrix} = \begin{bmatrix} 11+3t \\ -7+t \\ t \end{bmatrix} = \begin{bmatrix} 11 \\ -7 \\ 0 \end{bmatrix} + t \begin{bmatrix} 3 \\ 1 \\ 1 \end{bmatrix}.$$

2. Find the solution to the system of equations:

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**Solution:** You should find that the unique solution is