Name: Solutions Date: 01/25/2018

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

1. Find the general solution of the linear system whose augmented matrix is

$$\begin{bmatrix} 1 & -3 & -5 & 0 \\ 0 & 1 & -1 & -1 \end{bmatrix} \sim \left[\begin{array}{cccc} \textcircled{1} & 0 & -8 & -3 \\ 0 & \textcircled{1} & -1 & -1 \end{array}\right]$$

x_1 x_2 x_3

Basic variables : x_1, x_2

Free variable : x_3

Then $\begin{cases} x_1 = -3 + 8x_3 \\ x_2 = -1 + x_3 \\ x_3 \text{ is free} \end{cases}$ general solution of the system

2. Find the echelon form of the matrix

$$\begin{bmatrix} 1 & 2 & 0 & 3 \\ 2 & 4 & 2 & 4 \\ 3 & 6 & 2 & 7 \end{bmatrix} \begin{matrix} R_2 = R_2 - 2R_1 \\ R_3 = R_3 - 3R_1 \end{matrix} \begin{bmatrix} 1 & 2 & 0 & 3 \\ 0 & 0 & 2 & -2 \\ 0 & 0 & 2 & -2 \end{bmatrix}$$

$$R_3 = R_3 - R_2 \begin{bmatrix} 1 & 2 & 0 & 3 \\ 0 & 0 & 2 & -2 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

echelon form

(or $\begin{bmatrix} 1 & 2 & 0 & 3 \\ 0 & 0 & 1 & -1 \\ 0 & 0 & 0 & 0 \end{bmatrix}$)