

# M110 Assignment 1

011/10/16

P1: Q1

$$3x - y + z = 2$$

$$x + z = 1$$

$$y - 3z = 0$$

$$\downarrow$$

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

$$\xrightarrow{R_1 \leftrightarrow R_2} \begin{bmatrix} 1 & -1 & 1 & 1 \\ 3 & 0 & 1 & 2 \\ 0 & 1 & -3 & 0 \end{bmatrix}$$

$$\xrightarrow{\text{[scribble]}} \begin{bmatrix} 1 & -1 & -1 & 0 \\ 1 & 0 & 1 & 1 \\ 0 & 1 & -3 & 0 \end{bmatrix}$$

$$\xrightarrow{R_2 \rightarrow R_2 - R_1} \begin{bmatrix} 1 & -1 & -1 & 0 \\ 0 & 1 & 2 & 1 \\ 0 & 1 & -3 & 0 \end{bmatrix}$$

$$\xrightarrow{R_1 = R_1 + R_2} \begin{bmatrix} 1 & 0 & 1 & 1 \\ 0 & 1 & 2 & 1 \\ 0 & 1 & -3 & 0 \end{bmatrix}$$

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

$$R_3 \rightarrow R_3 - R_2 \rightarrow \begin{bmatrix} 1 & 0 & 1 & 1 \\ 0 & 1 & 2 & 1 \\ 0 & 0 & -5 & -1 \end{bmatrix}$$

$$\left(-\frac{1}{5}\right) R_3 \rightarrow \begin{bmatrix} 1 & 0 & 1 & 1 \\ 0 & 1 & 2 & 1 \\ 0 & 0 & 1 & \frac{1}{5} \end{bmatrix}$$

$$\begin{array}{l} R_1 = R_1 - 1R_3 \\ R_2 = R_2 - 2R_3 \end{array} \rightarrow \begin{bmatrix} 1 & 0 & 0 & \left(1 - \frac{1}{5}\right) \\ 0 & 1 & 0 & 2 - 2\left(\frac{1}{5}\right) \\ 0 & 0 & 1 & \frac{1}{5} \end{bmatrix}$$

$$\rightarrow \begin{bmatrix} 1 & 0 & 0 & \frac{4}{5} \\ 0 & 1 & 0 & \frac{3}{5} \\ 0 & 0 & 1 & \frac{1}{5} \end{bmatrix}$$