

1. Let  $A = \begin{bmatrix} 3 & -6 & 1 \\ 0 & 2 & 0 \\ -2 & 8 & 1 \end{bmatrix}$  and  $\mathbf{b} = \begin{bmatrix} 5 \\ -10 \\ -5 \end{bmatrix}$ . Compute  $A^{-1}$  by the row reduction algorithm (you may use your calculator to do the row reduction, but show the setup at least). It would be a good idea to check at least one of  $AA^{-1} = I_3$ ,  $A^{-1}A = I_3$ . Solve  $A\mathbf{x} = \mathbf{b}$  by using  $A^{-1}$  (show the setup at least, even if you use your calculator to do the arithmetic).

2. The transition matrix for a certain process with states  $H$ ,  $M$ , and  $L$  is given

$$\text{by } A = \begin{array}{ccc|c} & H & M & L \\ \hline H & 0.3 & 0.2 & 0.1 \\ M & 0 & 0.2 & 0.4 \\ L & 0.7 & 0.6 & 0.5 \end{array} .$$

If the initial states are  $H = 0$ ,  $M = 0$ ,  $L = 100$ ,  
what are the values after two steps?