# Homework - July 12
## Section 4.9

6. First, we subtract the identity matrix. $P - I = \begin{bmatrix} -.2 & .5 \\ .2 & -.5 \end{bmatrix}$. Then, we reduce $P - I$ augmented by $\mathbf{0}$. $\begin{bmatrix} P - I & \mathbf{0} \end{bmatrix} \sim \begin{bmatrix} 1 & -2/5 & 0 \\ 0 & 0 & 0 \end{bmatrix}$. Solutions to this system have the form $x \begin{bmatrix} 2/5 \\ 1 \end{bmatrix}$ for any scalar $x$. This set is equal to $x \begin{bmatrix} 2 \\ 5 \end{bmatrix} = x \begin{bmatrix} 2/7 \\ 5/7 \end{bmatrix}$. Because the sum of the entries in this last vector is 1, our steady state vector is $\mathbf{q} = \begin{bmatrix} 2/7 \\ 5/7 \end{bmatrix}$.