

5. If you are playing a game in which you have a 40% chance of winning or losing \$1 and a 20% chance of breaking even. You quit if either you go broke or end up with \$3. What is the long term behavior if you start with \$1 or \$2? Write down the transition matrix for this process, indicating the absorbing states. Label the transition matrix and identify the absorbing states. Identify  $A$  and  $(I - B)$  in determining the long term behavior. What is the probability of going broke if you start with \$1?

		Absorbing		From		not absorbing				
		0	3	1	2					
Abs.	0	1	0	.4	0	= T	A	A =		
to	3	0	1	0	.4				B	I - B =
not	1	0	0	.2	.4					
abs.	2	0	0	.4	.2					

$$A = \begin{bmatrix} .4 & 0 \\ 0 & .4 \end{bmatrix}$$

$$I - B = \begin{bmatrix} .8 & -.4 \\ -.4 & .8 \end{bmatrix}$$

$$(I - B)^{-1} = \begin{bmatrix} 5/3 & 5/6 \\ 5/6 & 5/3 \end{bmatrix}$$

$$L = \begin{bmatrix} 0 & 3 & 1 & 2 \\ 3 & 0 & 1 & 2 \\ \hline 1 & \bigcirc & \bigcirc & \bigcirc \\ 2 & \bigcirc & \bigcirc & \bigcirc \end{bmatrix}$$

2/3 Probability of going broke if you start with \$1.